RNAS-1200 Series User's Manual

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www.moxa.com/product

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RNAS-1200 Series User's Manual

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1

Introduction

Thank you for choosing Moxa's RNAS-1200 Network Attached Storage (NAS) system. The RNAS-1200 Series is designed to provide high performance, high reliability and high capacity storage for video surveillance or other industrial applications.

This manual details the hardware, installation, and software configuration, so that users can easily start using RNAS-1200 devices.

The following topics are covered in this chapter:

- **Overview**
- **Package Checklist**
- **Product Features**
- **Hardware Specifications**
- **Software Specifications**

Overview

Moxa's RNAS-1200 Series are network-attached storage (NAS) units designed to provide high performance, high reliability, and high capacity data storage in harsh industrial environments.

The RNAS-1200 Series is built with a fanless, thermally efficient, dust- and water-protected IP 54-rated chassis. This sealed enclosure eliminates internal fans as a point of critical system failure, protecting the internals from dust and splashed water. These devices are further compliant with the essential sections of EN 50155 covering operating temperature, power input voltage, power surges, ESD, and vibration, ensuring RNAS-1200 devices will operate reliably under the temperature and vibration extremes common to rolling stock.

The RNAS-1200 Series also comes with Moxa's Intelligent Heating Solution™ (IHS) and Data XPro™ technologies. IHS automatically heats the system to ensure reliable operation even in extremely low temperatures, while the Data XPro™ utility provides intelligent data and drive protections against extremes of heat and vibration. In addition, the series' remarkably fast array synchronizations at last make the full data and hardware redundancies of RAID 1 a feasible alternative for industrial applications, while the two Gigabit PoE+ network interfaces provide not only network redundancy, but also a highly efficient, fully redundant power supply over the same set of wires, as well.

The RNAS-1200 Series combines simple configuration and multiple data and hardware redundancies in a compact, durable, fanless chassis ideal for industrial environments where temperature and vibration are a concern. Whether for video surveillance of rolling stock or remote site storage of other logged data, the RNAS-1200 Series of rugged NAS is your best choice for industrial-strength data storage.

Package Checklist

The RNAS-1200 Series includes the following models:

RNAS-1201-T: Network-attached storage with 2 M12 Gigabit PoE+ LAN ports, -40 to 70°C temperature tolerance (operating)

RNAS-1211-T: Network-attached storage with 2 M12 Gigabit PoE+ LAN ports, -40 to 70°C temperature tolerance (operating), and 2 pre-installed 100 GB hard disks

NOTE Conformal coating is available on request.

Each model is shipped with the following items:

- RNAS-1200 storage appliance
- Wall mounting kit
- Documentation and software CD
- Quick installation guide (printed)
- Warranty card

NOTE Please notify your sales representative if any of the above items are missing or damaged.

Product Features

- Onboard Marvell 1.0 GHz processor
- Built-in 512 MB DDRII memory
- 2 Gigabit Ethernet ports for network redundancy
- 2 pre-installed 100 GB disks (RNAS-1211-T model only)
- Compliant with EN 50121-4 and essential sections of EN 50155
- IEC 61373 certified for shock and vibration resistance
- JBOD, BIG, RAID 0, and RAID 1 disk architectures
- Intelligent Heating Solution™ (IHS) technology for reliable operation
- Data XPro™ utility for protection of data against extreme heat and vibration
- Fast RAID 1 synchronizations

Hardware Specifications

Computer

CPU: Onboard Marvell 1.0 GHz 88F6281
DRAM: 512 MB DDRII
Flash Memory: Onboard 2 GB USB DOM for OS storage

Storage

RNAS-1201-T: 2.5-inch HDD bay x 2, reserved for storage expansion
RNAS-1211-T: 100 GB HDD x 2 pre-installed

Ethernet Interface

LAN: 2 auto-sensing 10/100/1000 Mbps ports (M12)

IHS Control

IHS Function Control: Temperature reading, power output control

LEDs

System: RAID, Ready, HDD1, HDD2
LAN: 100M/Link x 2, 1000M/Link x 2

Physical Characteristics

Housing: Aluminum
Weight: 1.98 kg (RNAS-1201-T)/2 kg (RNAS-1211-T)
Dimensions: 252 x 130 x 57 mm (9.92 x 5.12 x 2.24 in)
Mounting: Wall
IP Rating: IP 54

Environmental Limits

Operating Temperature: -40 to 70°C (-40 to 158°F)
Storage Temperature: -40 to 85°C (-40 to 176°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)
Anti-vibration: EN 50155 standard
Anti-shock: EN 50155 standard
Conformal Coating: Available on request

Power Requirements

Input: PoE (IEEE 802.3af) or PoE+ (IEEE 802.3at)
Note: If the RNAS-1200 has connected to a PoE switch, and T1 mode has been configured, it can only boot up when the ambient temperature is above 0°C.

Standards and Certifications

Safety: UL 60950-1
EMC: EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 55024
Rail Traffic: EN 50155, EN 50121-3-2, EN 50121-4, IEC 61373

Green Product: RoHS, CRoHS, WEEE

EMI: FCC Part 15 Subpart B Class A, CISPR 22:2008

Warranty

Warranty Period: 5 years (storage drive not included)

Details: See www.moxa.com/warranty

Note: These hardware specifications describe the network-attached storage unit itself, but not its accessories. In particular, the wide temperature specification does not apply to accessories such as power adaptors and cables.

Software Specifications

Operating System

System Platform: Linux 2.6 pre-installed

Network

IP Settings: Fixed IP, DHCP

Redundancy: Port trunking/NIC teaming

System Management

Firmware Upgrade: Can be run via web interface

System Bootup: Can be observed by LED indicators for system status

HDD Failure Status: Can be observed by LED indicators

Disk Management

JBOD: Two drives operate independently

Spanning Big: Two drives are merged into a single, oversized virtual drive

RAID 0: Two drives are merged, with data striped across the disks to improve data access times

RAID 1: Two drives operate as a single drive, with full hardware and data redundancy

RAID 1 Data Recovery: RAID 1 allows full data recovery upon failure or replacement of any single drive.

Data Protection

Vibration Protection: Non-volatile storage buffer for temporary drive shut-downs due to strong vibration

Temperature Protection: Auto-shutdown, non-volatile storage buffer for temporary shutdowns, and automatic system heating utility for below-zero environments

Fast Sync.: 15 second drive synchronizations in RAID 1 mode

SNMP Management

System: Standard MIB-II (RFC 1213), plus additional Moxa features that include: NTP, time zone, and time display management; channel bonding and IP configuration; management of SSH, FTP, and DNS; and configuration of SNMP agents and traps.

2

Hardware Introduction

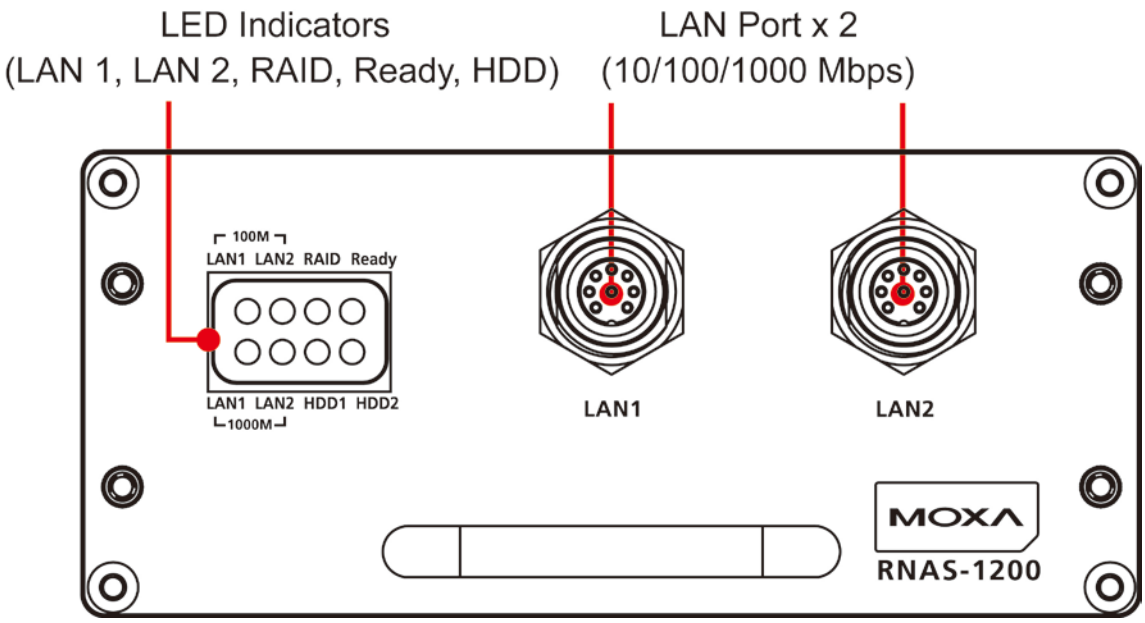
This chapter describes the hardware introduction, including the appearance of the RNAS-1200 Series, product dimensions, and LED indicators.

The following topics are covered in this chapter:

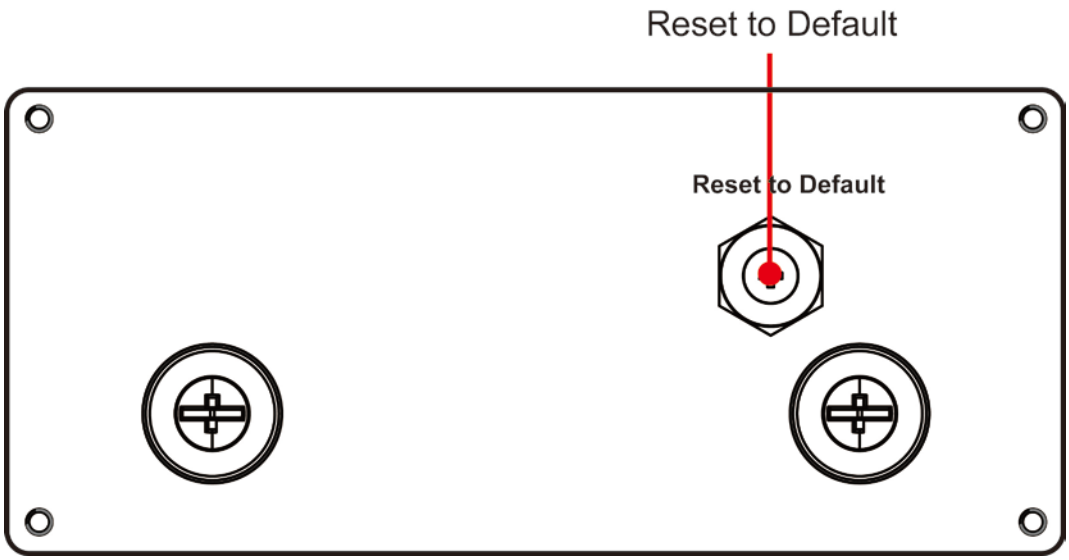
- **Hardware Layout**
  - Front View
  - Rear View
- **Dimensions**
- **LED Indicators**
- **Real Time Clock**

Hardware Layout

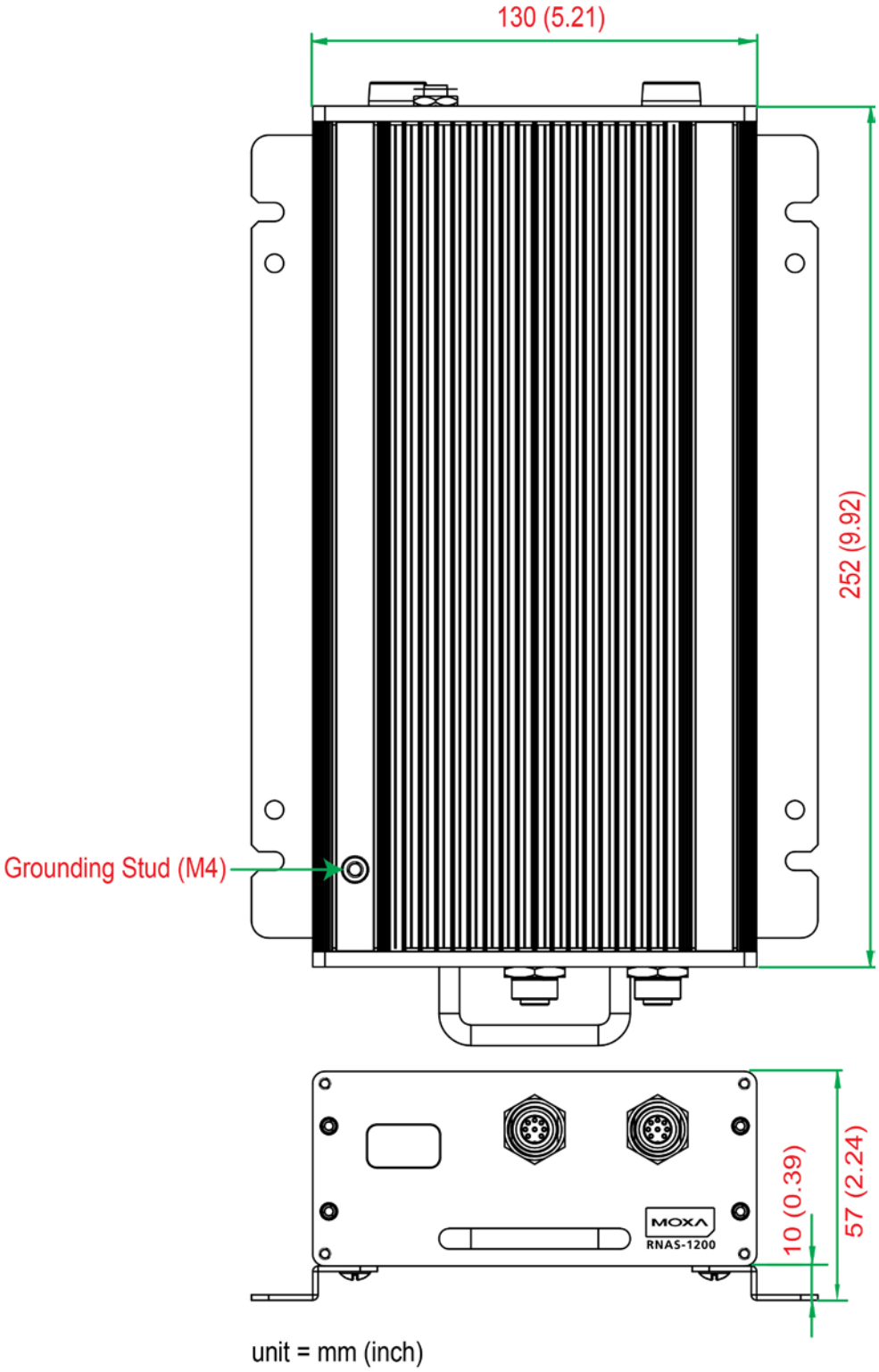
Front View



Rear View



Dimensions


130 (5.21)
252 (9.92)
Grounding Stud (M4)
MOXA
RNAS-1200
10 (0.39)
57 (2.24)
unit = mm (inch)

LED Indicators

LED Name	LED Color/Status		LED Function
Ready	Green		Power is on and functioning normally
	On 1 sec	Off 1 sec	Resetting to default
	On 5 sec	Off 5 sec.	IHS pre-heating
	Off		Power error, or off
RAID	Red		RAID recovery fails
	On 1 sec	Off 0.5 sec	RAID disk is recovering
	On 5 sec	Off 1 sec	HDD1 fails
	On 10 sec	Off 1 sec	HDD 2 fails
	On 15 sec	Off 1 sec	HDD 1 and HDD2 fail
	On 1 sec	Off 5 sec	HDD overheated; no power
	Off		RAID recovery complete, or no activity
LAN (1, 2)	Green		100 Mbps Ethernet mode
	Yellow		1000 Mbps Ethernet mode
	Off		No Ethernet activity
HDD1	Yellow		Drive 1 is writing/reading data
	Off		No activity
HDD2	Yellow		HDD2 is writing/reading data
	Off		No activity

Real Time Clock

The embedded computer's real-time clock is powered by a lithium battery. We strongly recommend that you **NOT** replace the lithium battery on your own. If the battery needs to be changed, contact the Moxa RMA service team at http://www.moxa.com/rma/about_rma.aspx.

WARNING

There is a risk of explosion if the wrong type of battery is used. To avoid this potential danger, always be sure to use the correct type of battery. Contact the Moxa RMA service team if you need to replace your battery.

Caution

There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the manufacturer's instructions, and be aware that local ordinances may require special handling as a hazardous substance.

3

Hardware Connection Description

In this chapter, we show how to connect the RNAS-1200 to the network and to various devices.

The following topics are covered in this chapter:

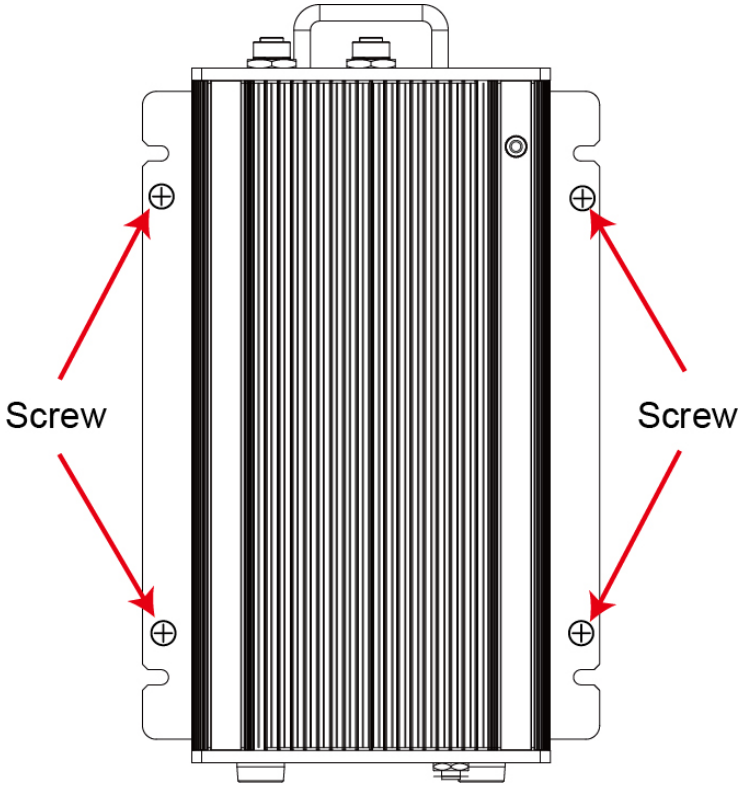
- **Installing the RNAS-1200**
- **Connecting the Power**
- **Connecting to the Network**
- **Installing the Storage Drive**
- **Installing the RNAS-1200 into a Wall-mounting Frame**
- **RNAS-1200 Administration**

Installing the RNAS-1200

Wall or Cabinet Mounting

The RNAS-1200 provides two mounting kits, for either walls or cabinets.

Attach the brackets to either side of the chassis with the included screws



Connecting the Power

To power on the RNAS-1200, simply connect the Ethernet port to any Ethernet switch that supports PoE or PoE+. Once the system is fully powered and initialized, the **Ready** LED will light up.

ATTENTION

If the RNAS-1200 has connected to a PoE switch, and T1 mode has been configured, it can only boot up when the ambient temperature is above 0°C.

Connecting to the Network

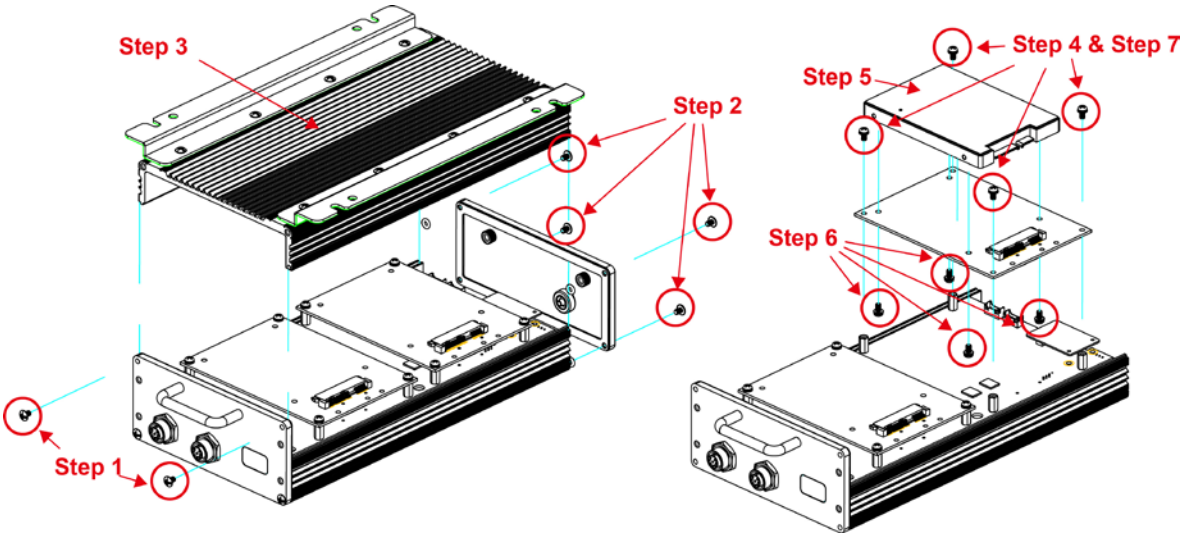
Plug your network cable into the RNAS-1200's Ethernet port. The other end of the cable should be plugged into your Ethernet network. When the cable is properly connected, the LEDs on the RNAS-1200's Ethernet port will glow to indicate a valid connection.

The 10/100/1000 Mbps Ethernet LAN port uses 8-pin M12 connectors. The following diagram shows the pinouts for these ports.

No.	10/100 Mbps	1000 MBps
1	–	TRD3+
2	–	TRD4+
3	–	TRD4-
4	ERx-	TRD1-
5	ETx+	TRD2+
6	ERx+	TRD1+
7	–	TRD3-
8	ETx-	TRD2-

Installing the Storage Drive

The RNAS-1200 Series has two SATA connectors for two SATA disks. The RNAS-1211 model comes with two pre-installed 100 GB hard disk drives. . To install SATA storage drives into the RNAS-1201, refer to the following figures.

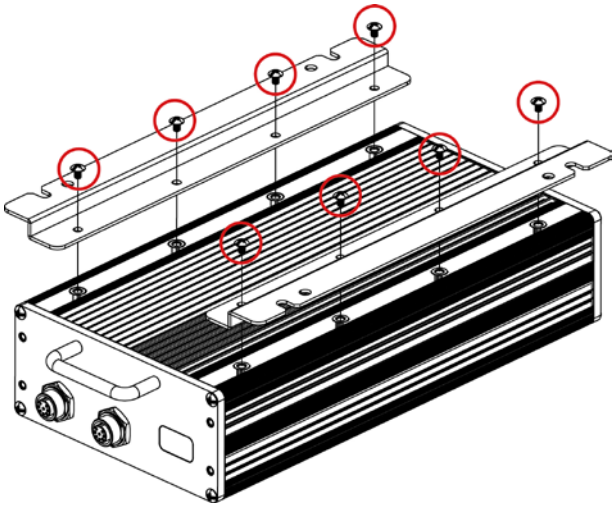


Step 1: Remove the two screws on the front panel.
Step 2: Remove the four screws on the rear panel.
Step 3: Remove the top cover of the RNAS-1200.
Step 4: Remove the four screws on the drive's mounting tray, and remove the tray from the RNAS.
Step 5: Situate the drive so that its four holes match up with the tray's mounting holes.
Step 6: Affix the drive to the mounting tray using the four screws you have just removed.
Step 7: Re-affix the mounting tray (with the now mounted storage drive on top) to the RNAS drive slot.
Step 8: To install the second drive, repeat steps four through seven. .
Step 9: Secure the enclosure by reversing the first 3 steps of this procedure.

Installing the RNAS-1200 into a Wall-mounting Frame

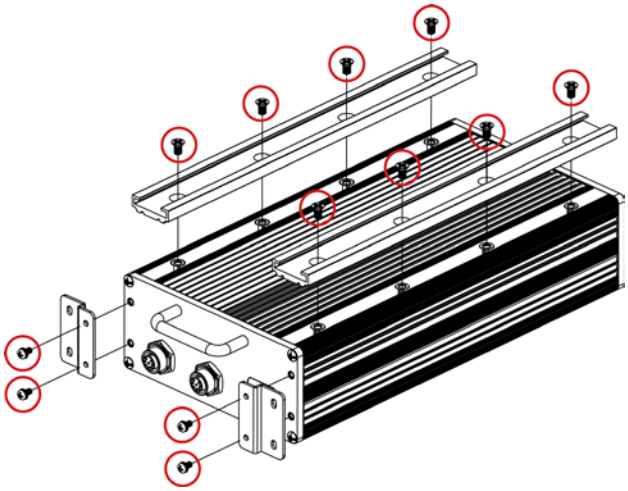
An optional wall-mounting kit is available for the RNAS-1200. To install, follow the steps below.

Step 1: Remove the eight screws that fasten the wall-mount ears to the RNAS-1200.

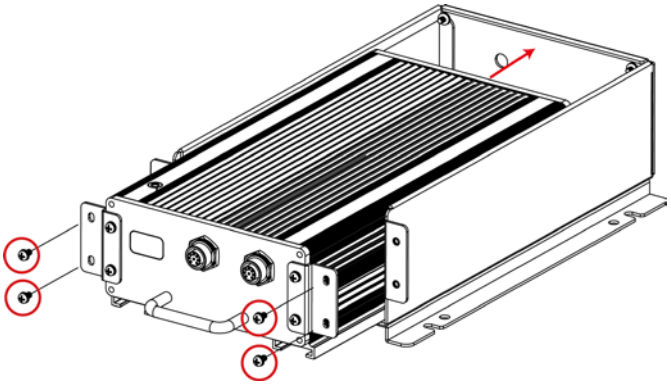


Step 2: Replace the wall-mount ears with two rails (which run the length of the device) using the same eight screws.

Step 3: Fasten the faceplate brackets to the front panel of the RNAS using the four screws provided.



Step 4: Align the tracks with the fixed rails within the wall-mounting frame, slide the RNAS-1200 into the tray, and fasten the device using the brackets you have just affixed to the front panel.



RNAS-1200 Administration

Power up the RNAS-1200 computer and verify that the power source is ready. Once the operating system boots up, the first step is to use the administrator account to configure the Ethernet interface. The factory default IP settings are show below:

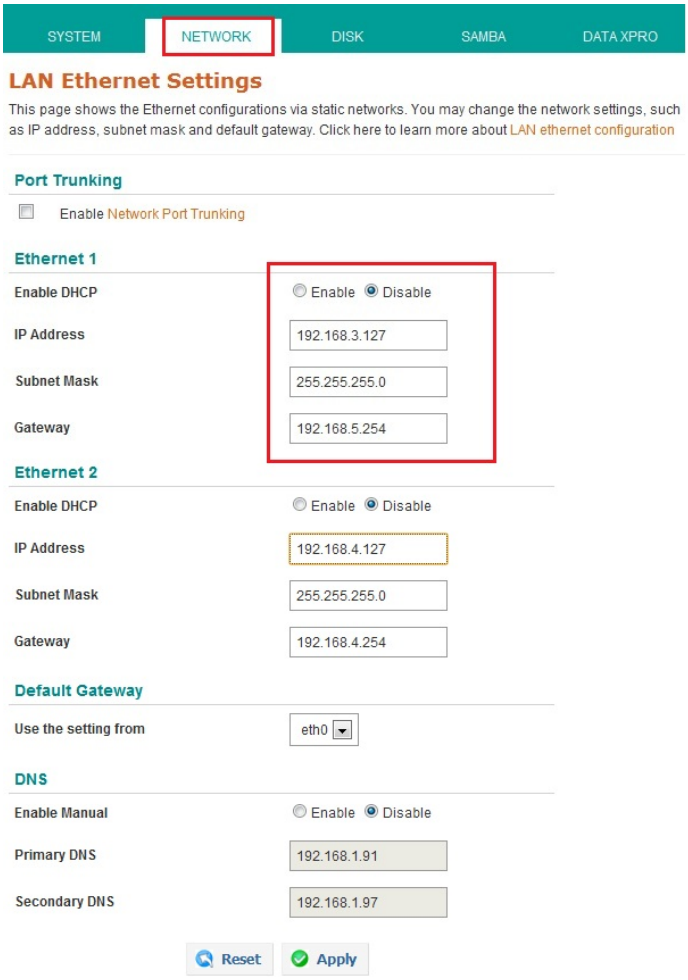
	Default IP Address	Netmask
LAN1	192.168.3.127	255.255.255.0
LAN2	192.168.4.127	255.255.255.0

You may use a web browser to access the RNAS-1200's configuration wizard. Simply connect to the RNAS-1200 over either LAN port, enter the appropriate IP address into a browser, and when prompted use **admin** as the default username and password.

Login: admin
Password: admin

To go directly to the RNAS-1200's IP configuration, click the **Network** tab in the main toolbar. There, you may set the Ethernet interfaces for static or DHCP addressing. To set up a static IP address, disable DHCP and then enter the IP address, subnet mask and gateway information in the specified fields. If two different gateways are configured, it will be necessary to select which LAN port will serve as the default gateway. Finally, enter DNS information in the bottom section of the page. When finished, click **Apply** to complete.

The networking configuration interface is shown on the following page of this installation guide, with the main IP addressing parameters highlighted.



4

Wizard Configuration Scenarios

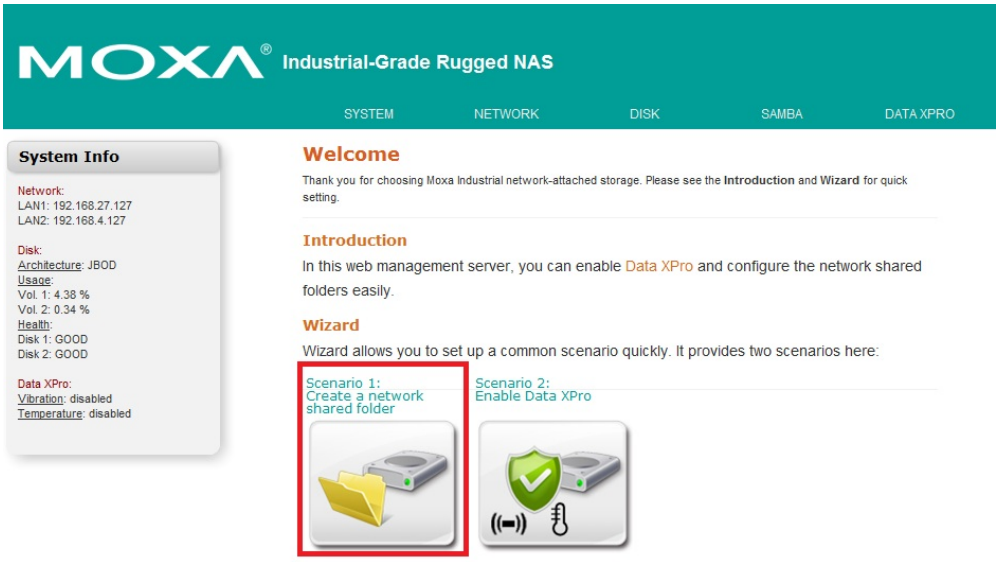
This chapter describes how to use the scenario wizard for basic configuration of the RNAS-1200. Users may use the wizard to quickly configure the device for some commonly used applications.

The following topics are covered in this chapter:

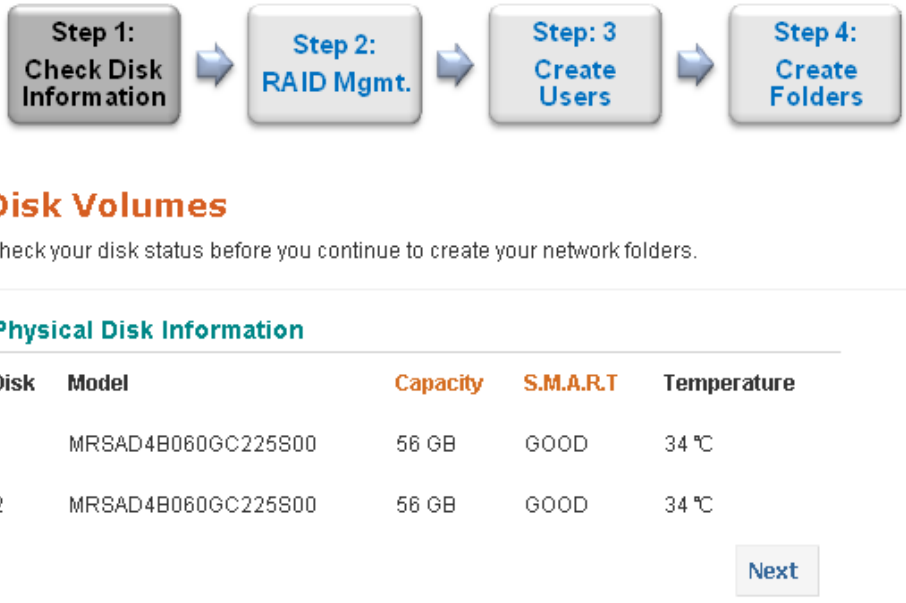
- **Creating a Shared Network Folder**
- **Enabling Data XPro**

Creating a Shared Network Folder

To create a network directory that may be shared over the network, click **Scenario 1: Create a network shared folder**. The link is located at the bottom of the **Welcome** page.



Review the drive information, and then click **Next** to continue.



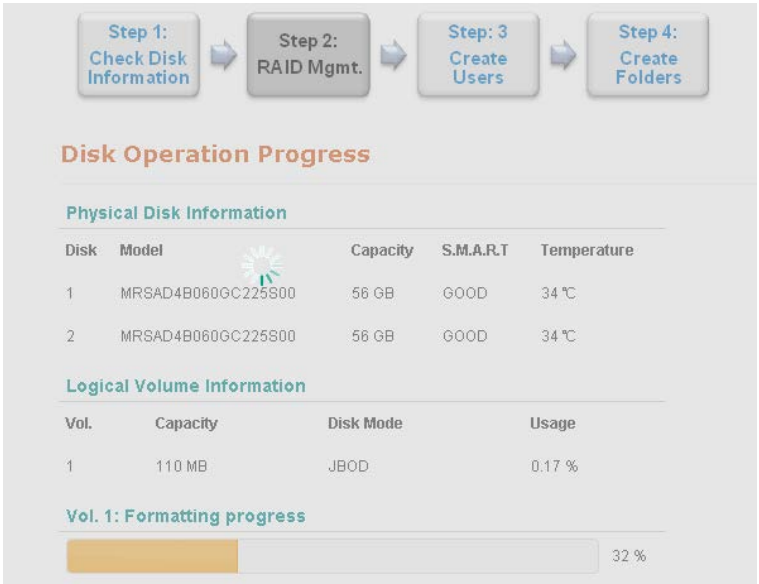
ATTENTION

If you want to use DataXPro, you have to enable it before you create a shared network folder.

You will be presented with the **RNAS Drive Architectures** page, from within the **DISK** tab.

Step 1: Check Disk Information
Step 2: RAID Mgmt.
Step: 3 Create Users
Step 4: Create Folders
RNAS Drive Architectures
On this page, you may configure the RNAS drive architecture. Four alternatives are offered: JBOD, BIG, RAID 0, and RAID 1.
For installations requiring high data security and drive reliability, Moxa recommends RAID 1 as the optimal configuartion.
Big
Enable disk encryption
The BIG configuration is also called SPANNING. Both disks are concatenated together as if they were one single drive, or one very large logical volume. BIG is different from RAID 0 because there is no striping of data involved: each drive handles data at the file level, without any write or read sharing between devices. BIG confgurations have no data redundancy, offer no increase in performance, and have a failure rate double that of JBOD. Alongside RAID 0, BIG/SPANNING configurations are significantly less reliable and secure than other configurations.
Next

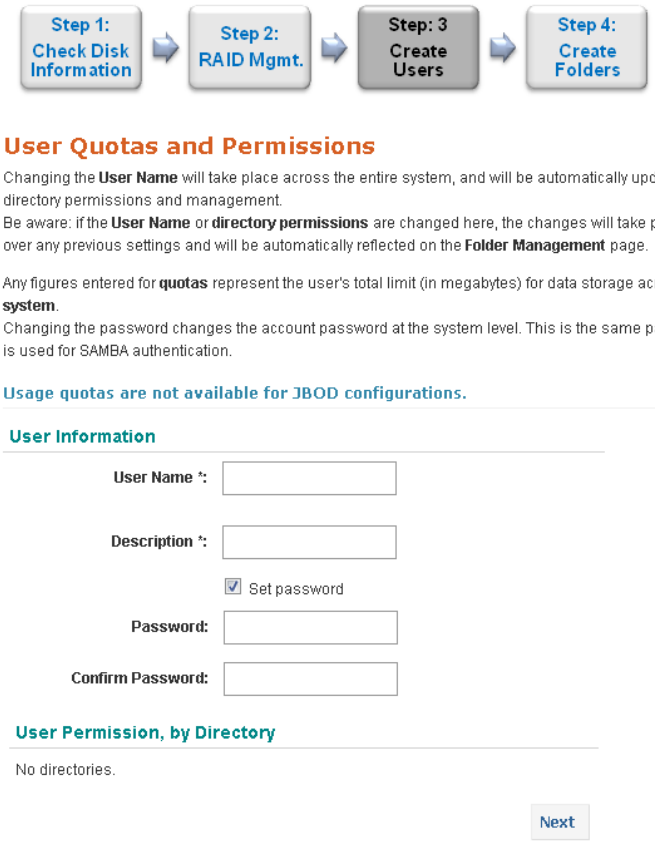
Click **Next** after you have selected the drive architecture and enabled or disabled disk encryption. Depending on the architecture you select, the system may take a long time to complete the procedure. You may get a basic idea of how much longer the procedure will take using the **Formatting Progress** bar at the bottom of the **Disk Operation Progress** page.


Step 1: Check Disk Information
Step 2: RAID Mgmt.
Step: 3 Create Users
Step 4: Create Folders
Disk Operation Progress
Physical Disk Information
Disk Model Capacity S.M.A.R.T Temperature
1 MRSAD4B060GC225S00 56 GB GOOD 34 ℃
2 MRSAD4B060GC225S00 56 GB GOOD 34 ℃
Logical Volume Information
Vol. Capacity Disk Mode Usage
1 110 MB JBOD 0.17 %
Vol. 1: Formatting progress
32 %

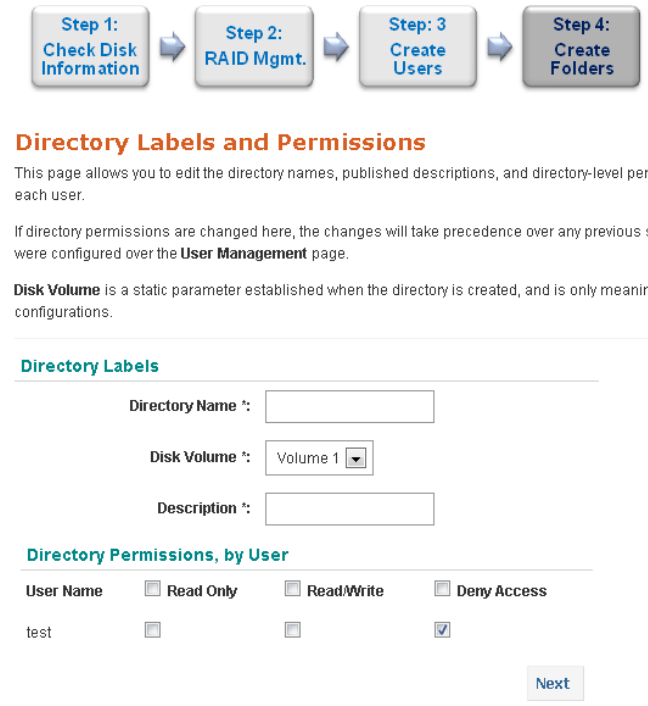
IMPORTANT!

The RNAS-1200 drive architecture wizard will automatically format your drives with an ext4 file system. After building a drive architecture, it is not necessary for users to re-format the drives.

After you have configured the basic drive architecture and formatted the drive(s), the page will redirect to the **User Quotas and Permissions** page, where you may create user accounts to access network directories. Click **Next** to continue.


Step 1: Check Disk Information
Step 2: RAID Mgmt.
Step: 3 Create Users
Step 4: Create Folders
User Quotas and Permissions
Changing the User Name will take place across the entire system, and will be automatically updated in directory permissions and management.
Be aware: if the User Name or directory permissions are changed here, the changes will take precedence over any previous settings and will be automatically reflected on the Folder Management page.
Any figures entered for quotas represent the user's total limit (in megabytes) for data storage across the entire system.
Changing the password changes the account password at the system level. This is the same password that is used for SAMBA authentication.
Usage quotas are not available for JBOD configurations.
User Information
User Name *:
Description *:
Set password
Password:
Confirm Password:
User Permission, by Directory
No directories.
Next

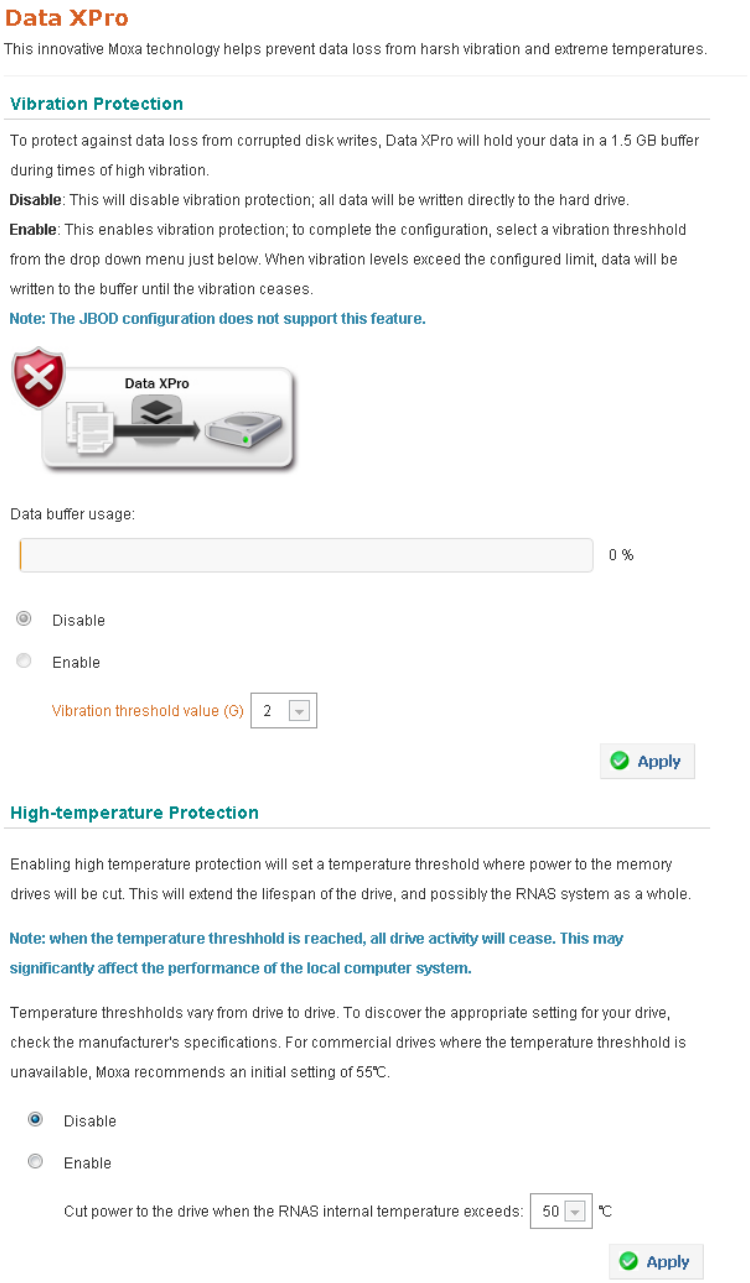
The **Directory Labels and Permissions** page lets you create a network directory and configure its access permissions. Changes to directory permissions here will be automatically reflected in the relevant user accounts. Click **Next** when you have completed your configuration.


Step 1: Check Disk Information
Step 2: RAID Mgmt.
Step: 3 Create Users
Step 4: Create Folders
Directory Labels and Permissions
This page allows you to edit the directory names, published descriptions, and directory-level permissions for each user.
If directory permissions are changed here, the changes will take precedence over any previous settings that were configured over the User Management page.
Disk Volume is a static parameter established when the directory is created, and is only meaningful in JBOD configurations.
Directory Labels
Directory Name *:
Disk Volume *:
Volume 1
Description *:
Directory Permissions, by User
User Name
Read Only
Read/Write
Deny Access
test
Next

Enabling Data XPro

The Data XPro™ utility is one of the RNAS-1200's key features; it helps prevent data loss from harsh vibration and hardware destruction from extreme temperatures. To configure Data XPro, click **Scenario 2: Enable Data XPro** to continue.

On the Data XPro page you may review the current usage capacity of the Data XPro data buffer. During times of high vibration this data buffer is used to store deferred data accesses. *The data buffer is not part of the high-temperature protection procedure*. During extremely high temperatures, Data XPro will cut power to the drives to protect against catastrophic hardware failure. The temperature threshold at which that happens is also configured here.


Data XPro
This innovative Moxa technology helps prevent data loss from harsh vibration and extreme temperatures.
Vibration Protection
To protect against data loss from corrupted disk writes, Data XPro will hold your data in a 1.5 GB buffer during times of high vibration.
Disable: This will disable vibration protection; all data will be written directly to the hard drive.
Enable: This enables vibration protection; to complete the configuration, select a vibration threshhold from the drop down menu just below. When vibration levels exceed the configured limit, data will be written to the buffer until the vibration ceases.
Note: The JBOD configuration does not support this feature.
Data XPro
Data buffer usage:
0 %
Disable
Enable
Vibration threshold value (G) 2
Apply
High-temperature Protection
Enabling high temperature protection will set a temperature threshold where power to the memory drives will be cut. This will extend the lifespan of the drive, and possibly the RNAS system as a whole.
Note: when the temperature threshhold is reached, all drive activity will cease. This may significantly affect the performance of the local computer system.
Temperature threshholds vary from drive to drive. To discover the appropriate setting for your drive, check the manufacturer's specifications. For commercial drives where the temperature threshhold is unavailable, Moxa recommends an initial setting of 55℃.
Disable
Enable
Cut power to the drive when the RNAS internal temperature exceeds: 50 ℃
Apply

WARNING

The temperature protection cutoff will result in an effective shutdown of the entire system. This includes the data buffer. ***No data will be stored in the buffer once the drives power down.*** Use this feature with caution: it is only intended for extreme temperature highs that are a significant threat to system survival.

5

Modify System Settings

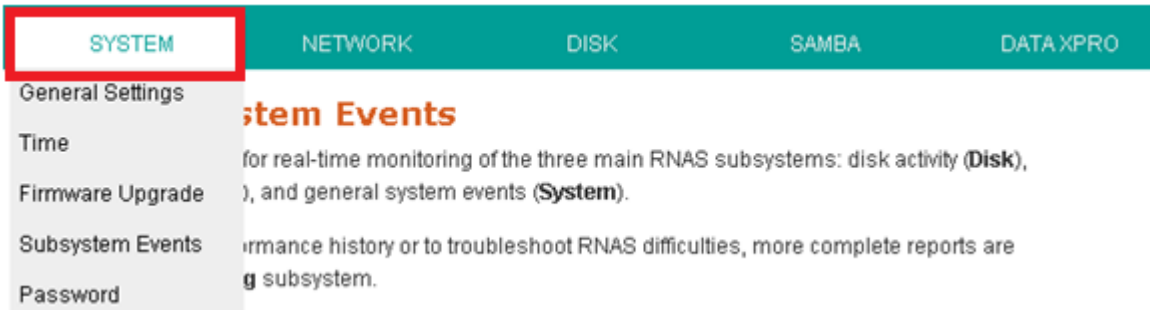
This chapter describes how to configure and modify the system settings.

The following topics are covered in this chapter:

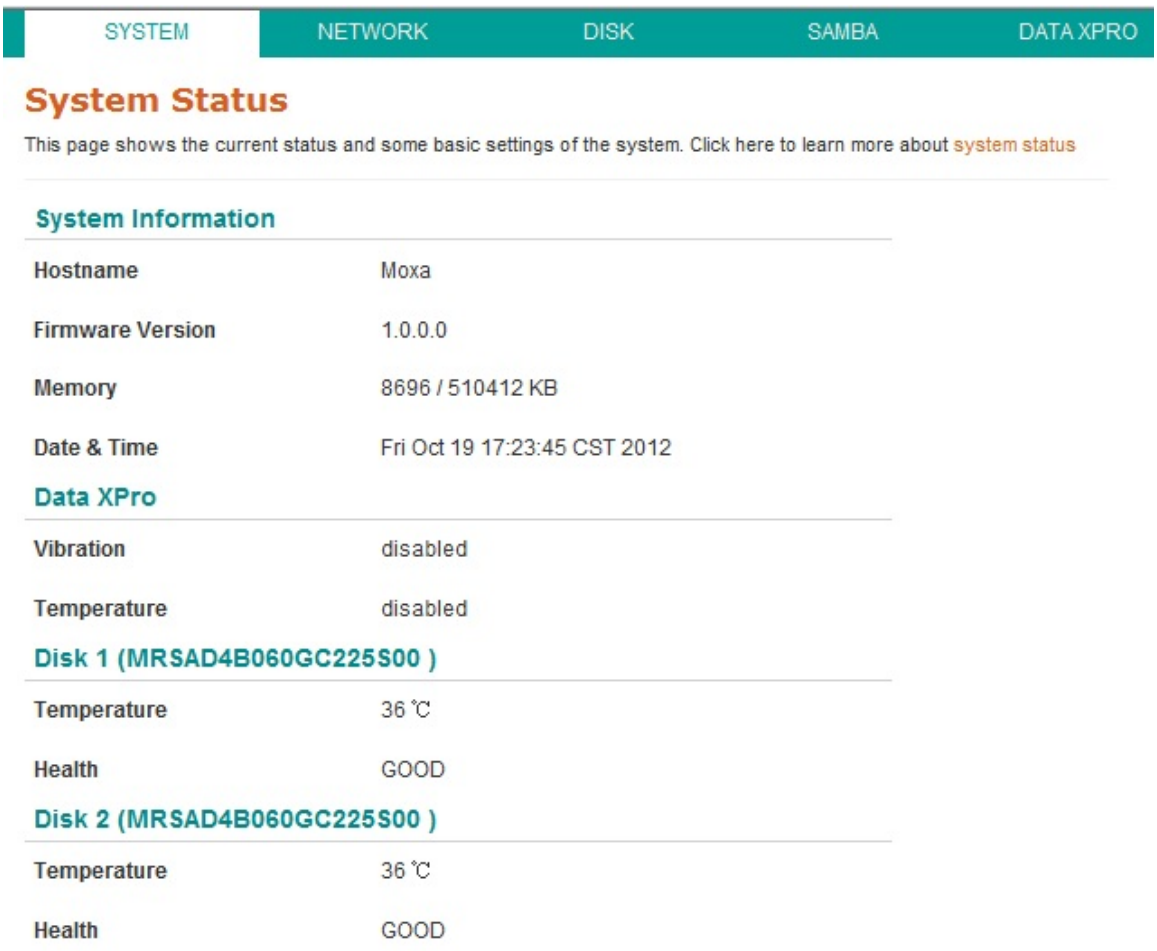
- **System Information**
  - General Settings
  - Time
  - Firmware Upgrade
  - Subsystem Events
  - Password

System Information

When successfully connecting to the RNAS-1200, you will be directed to the main page. Click **SYSTEM** for viewing detailed system information.

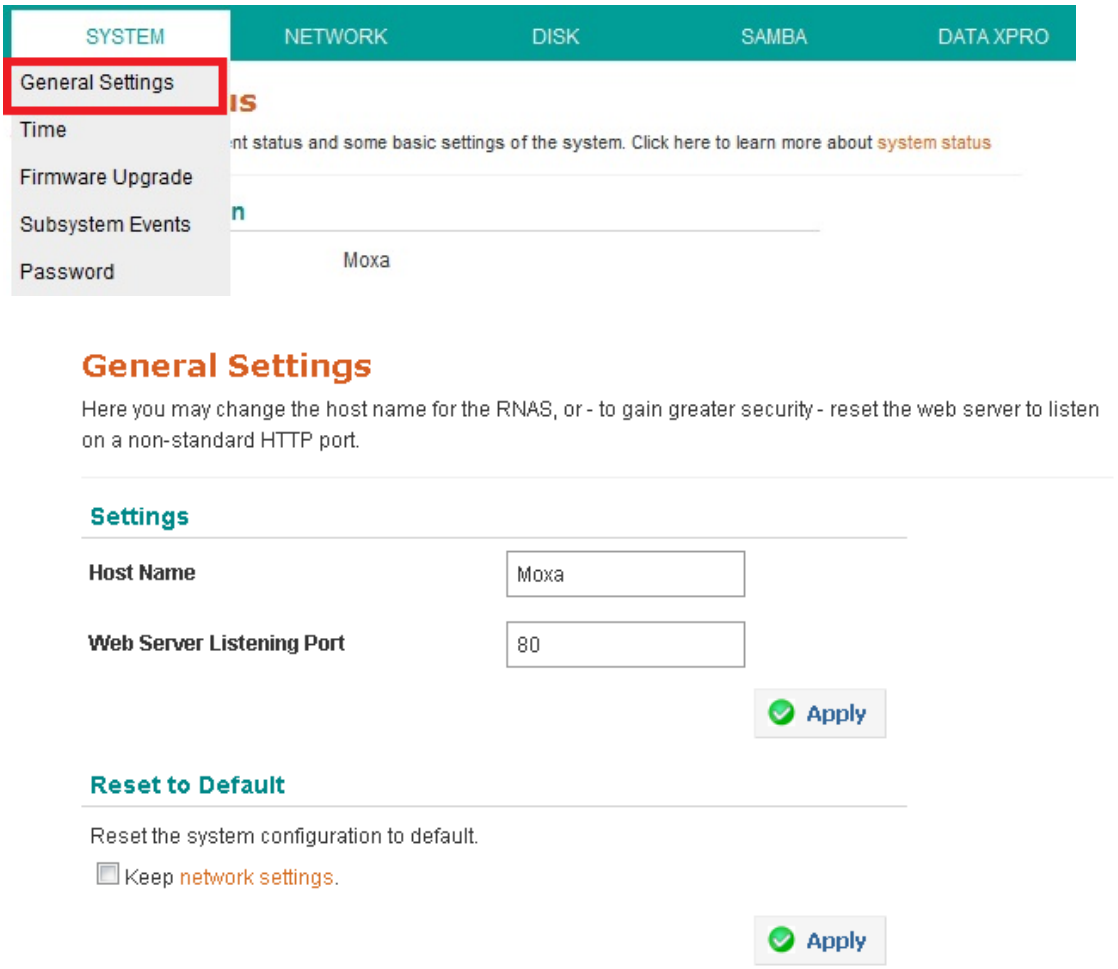


You may check system status, a system overview, Data XPro status, and disk status.



General Settings

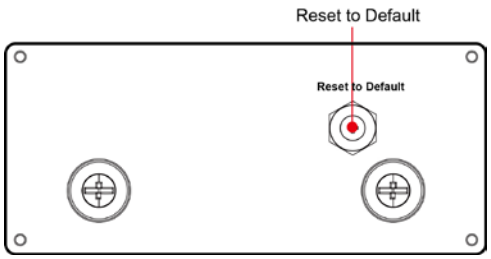
Click **General Settings** from the **SYSTEM** tab. Here you may configure the host name and the web server listening port for the RNAS-1200. This is the web server that serves the RNAS web configuration interface. ***Resetting this entry will result in a restart of the web interface, after which connection to the RNAS configuration UI will be broken.*** To reconnect, you will need to use your HTML browser to log on to the configuration interface over the port you have just configured (192.68.XX.XXX:YYY, where Y is the newly configured port number and XX.XXX is the user-configured IP address). To set your changes, click **Apply**.



Reset to Default

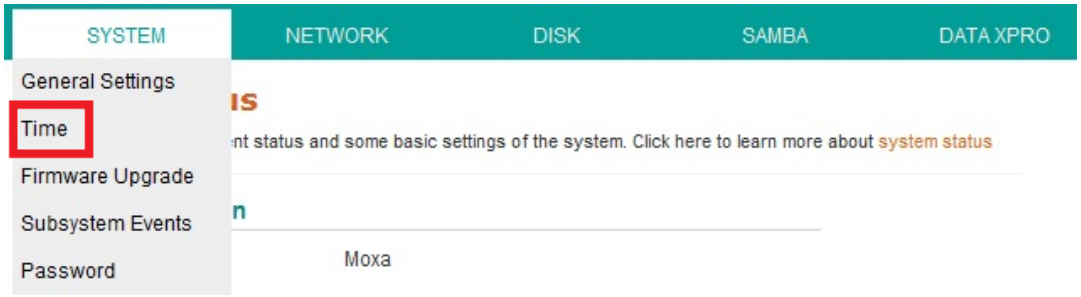
In addition, you may reset the entire system configuration to default values by applying the **Reset to Default** option. Select **Keep Network Settings** if you wish to reset the rest of the system but continue to use the current network settings. You may also reset the system to factory defaults by using a screwdriver (or other pointed tool) by push the **Reset to Default** button (on the rear panel of the RNAS-1200) and holding it for five seconds.

Please note that all data will be erased after resetting to default.

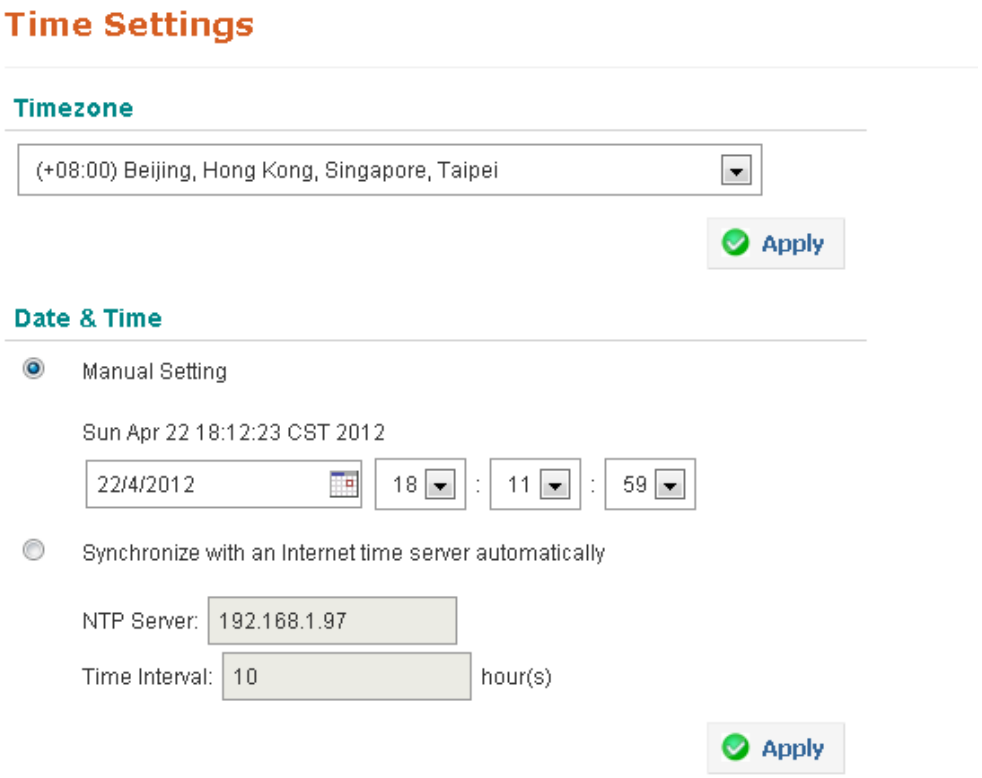


Time

Select **Time** from **SYSTEM tab** to configure the system time and clock.

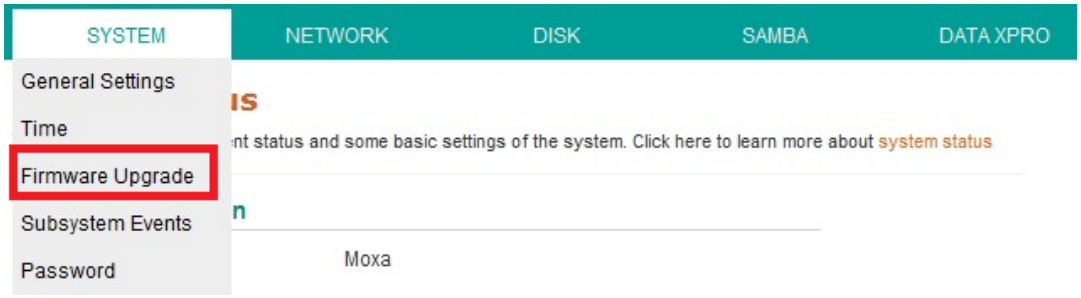


You may select a base time zone from the Timezone drop-down menu. When finished, click **Apply**. Next, to configure date and time you may choose either **Manual Setting** to set the time by hand, or to automatically **synchronize with an Internet time server** (i.e., an NTP server). Click **Apply** to complete the configuration.

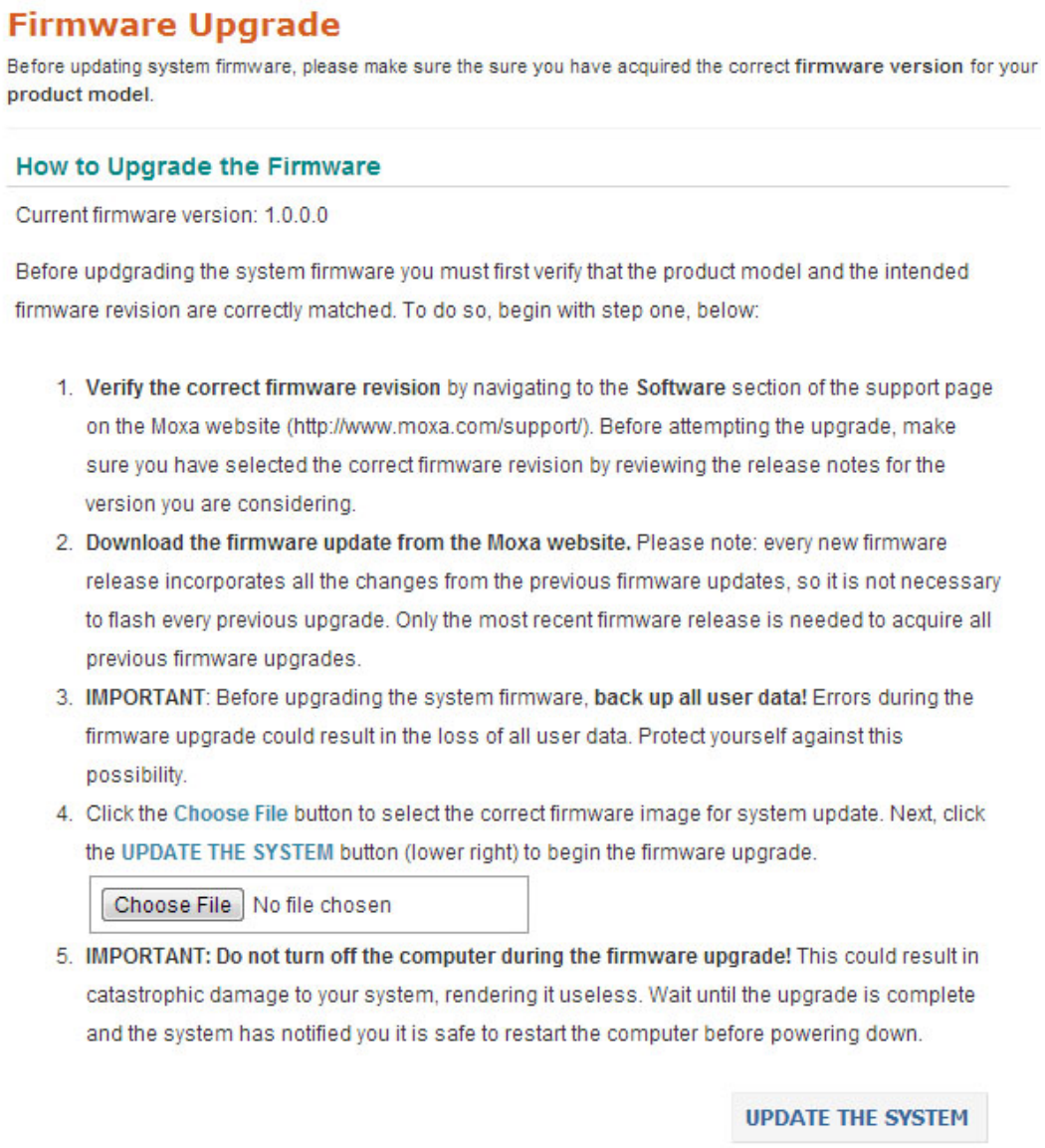


Firmware Upgrade

The **Firmware Upgrade** page is located under the **SYSTEM tab**.



This page allows you to automatically download new versions of the RNAS-1200 firmware from the Moxa website. To upgrade your firmware, please follow the steps listed exactly, and be careful to note the warnings. Be sure you have the correct version of the firmware and do not power off the RNAS-1200 during the upgrade process. When finished, click **UPDATE THE SYSTEM** to complete.

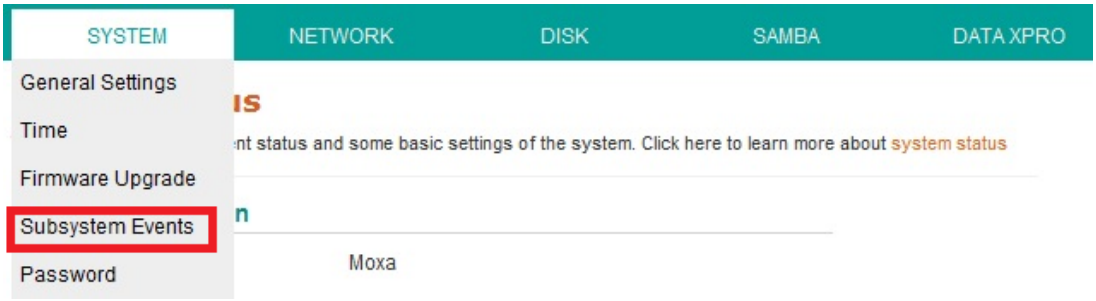

Firmware Upgrade
Before updating system firmware, please make sure the sure you have acquired the correct firmware version for your product model.
How to Upgrade the Firmware
Current firmware version: 1.0.0.0
Before updgrading the system firmware you must first verify that the product model and the intended firmware revision are correctly matched. To do so, begin with step one, below:
1. Verify the correct firmware revision by navigating to the Software section of the support page on the Moxa website (http://www.moxa.com/support/). Before attempting the upgrade, make sure you have selected the correct firmware revision by reviewing the release notes for the version you are considering.
2. Download the firmware update from the Moxa website. Please note: every new firmware release incorporates all the changes from the previous firmware updates, so it is not necessary to flash every previous upgrade. Only the most recent firmware release is needed to acquire all previous firmware upgrades.
3. IMPORTANT: Before upgrading the system firmware, back up all user data! Errors during the firmware upgrade could result in the loss of all user data. Protect yourself against this possibility.
4. Click the Choose File button to select the correct firmware image for system update. Next, click the UPDATE THE SYSTEM button (lower right) to begin the firmware upgrade.
Choose File
No file chosen
5. IMPORTANT: Do not turn off the computer during the firmware upgrade! This could result in catastrophic damage to your system, rendering it useless. Wait until the upgrade is complete and the system has notified you it is safe to restart the computer before powering down.
UPDATE THE SYSTEM

WARNING

Please note that the firmware upgrade will erase all data in the RNAS-1200. Back up any important data you wish to keep before undertaking the firmware upgrade.

Subsystem Events

Select **Subsystem Events** from **SYSTEM tab**.



This allows users to monitor three RNAS-1200 subsystems in real time. The three main subsystems are the drive activity (Disk), SAMBA activity (SAMBA), and general operating system events (System).

RNAS Subsystem Events

This is a simple viewer for real-time monitoring of the three main RNAS subsystems: disk activity (**Disk**), SAMBA activity (**SAMBA**), and general system events (**System**).

To analyze system performance history or to troubleshoot RNAS difficulties, more complete reports are available from the **syslog** subsystem.

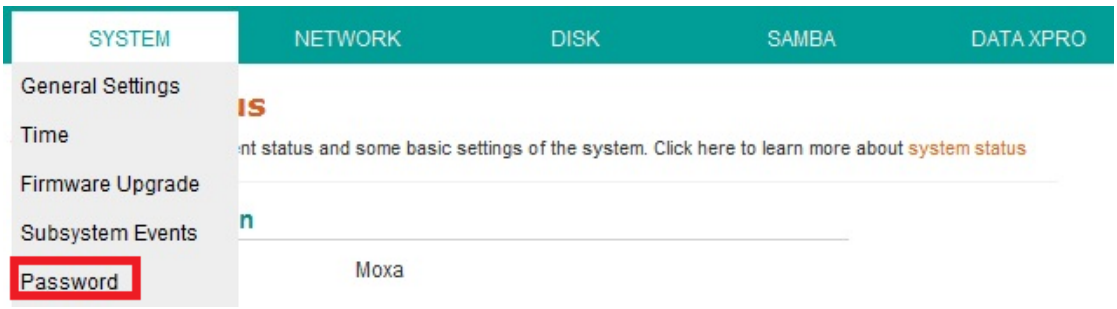
Syslog is accessible via the console using the **dmesg** command, with full reports of all subsystems and computer activity stored in the **/var/log** directory.

RNAS Subsystem	Event
System	2012-04-26 18:26:36 Turn up network interface eth1 select STATIC mode
System	2012-04-26 18:26:33 Turn up network interface eth0 select STATIC mode
System	2012-04-26 18:26:30 Turn down network interface eth1
System	2012-04-26 18:26:30 Turn down network interface bond0
System	2012-04-26 18:26:30 Normal network mode
System	2012-04-26 18:26:29 Turn down network interface eth0
System	2012-04-26 18:26:27 Starting the web service
System	2012-04-26 18:26:25 Stopping the web service
System	2012-04-26 18:26:25 Changing the web service login password
System	2012-04-26 18:26:18 Select ntp client to update system timer

1 2 3 Next › Last »

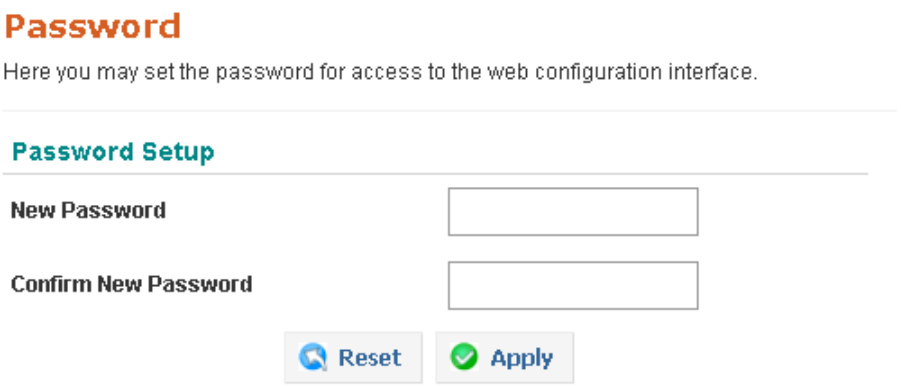
Password

The administration UI's password configuration page is accessed using **Password**, in the **SYSTEM tab**.



This page allows users to configure the password that will be used to access the RNAS web configuration interface.

To change the password, enter a new password in the upper box and then confirm it by retyping the password the in lower box. When finished, click **Apply** to complete. If the two strings match, then the RNAS-1200 is now reconfigured with the new password.



6

Modify Network Settings

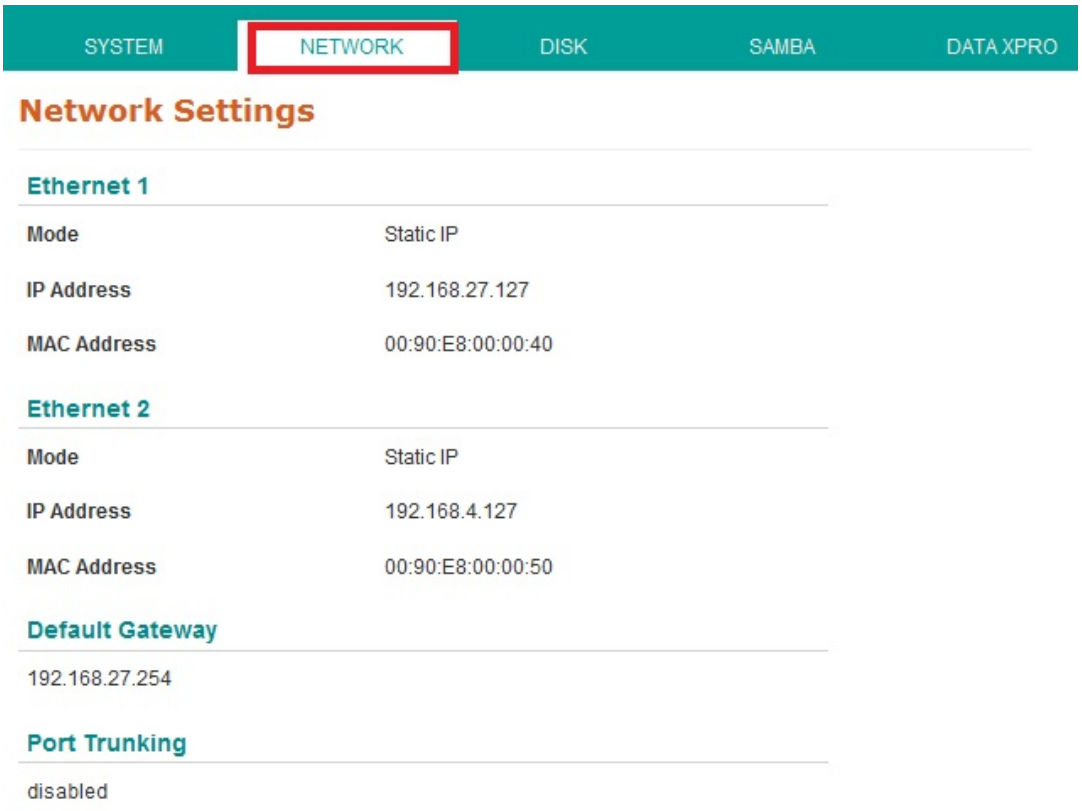
This chapter describes how to configure or modify the network settings of the RNAS-1200 models.

The following topics are covered in this chapter:

- **Network Settings**
  - Ethernet
  - SNMP
  - FTP/SSH

Network Settings

Click **NETWORK** in the navigation ribbon to view the current network settings for the RNAS-1200.



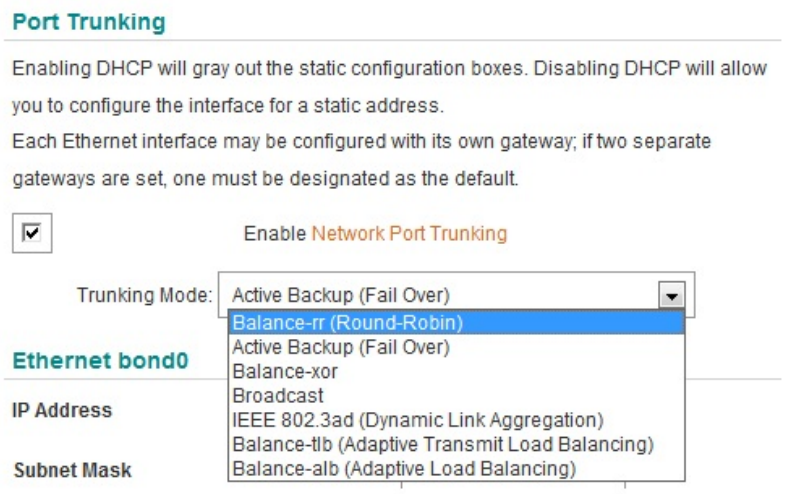
The summary overview includes the network settings for both Ethernet ports, as well as default gateway information and channel bonding / port trunking status.

Ethernet

Click **Ethernet** from within the **NETWORK** submenu to configure the basic Ethernet LAN settings.

IP Port Trunking / Channel Bonding

To enable IP port trunking / channel bonding, click **Enable Network Port Trunking**. Then, select the port trunking mode you wish to use.


Port Trunking
Enabling DHCP will gray out the static configuration boxes. Disabling DHCP will allow you to configure the interface for a static address.
Each Ethernet interface may be configured with its own gateway; if two separate gateways are set, one must be designated as the default.
Enable Network Port Trunking
Trunking Mode:
Active Backup (Fail Over)
Balance-rr (Round-Robin)
Active Backup (Fail Over)
Balance-xor
Broadcast
IEEE 802.3ad (Dynamic Link Aggregation)
Balance-tlb (Adaptive Transmit Load Balancing)
Balance-alb (Adaptive Load Balancing)
Ethernet bond0
IP Address
Subnet Mask

There are seven modes for IP bonding / port trunking. Below you will find summaries of their weak points and strong points. In most cases, mode five—**IEEE 802.3ad**, or **LACP**—will probably be the preferred mode.

1. **Balance-rr (Round-Robin)**
   Round robin mode transmits network packets in sequential order from the first available network interface (NIC slave) through the last. This mode provides rudimentary load balancing and high fault tolerance. If a switch is being used, an appropriate switch configuration will be required. Be warned: some switches do not support balance-rr. If the bandwidth of one of the NICs deteriorates, then the total bandwidth of the interface drop an equal amount.

2. **Active Backup (Failover)**
   In failover mode, only one NIC in the bond is used to actively transmit packets. The alternate NIC becomes active if, and only if, the default fails. The single, logical interface's MAC address is externally visible on only one NIC (port) at a time, to avoid distortion in network switches. This mode provides strong redundancy and high fault tolerance.

3. **Balance-xor**
   Balance-xor balances outgoing traffic across the active ports using hashed protocol headers. This lets it accept incoming traffic from either port. The hash used to transmit network packets is `[(source MAC address XOR'd with destination MAC address) modulo NIC slave count]`. This mode provides high load balancing and high fault tolerance.

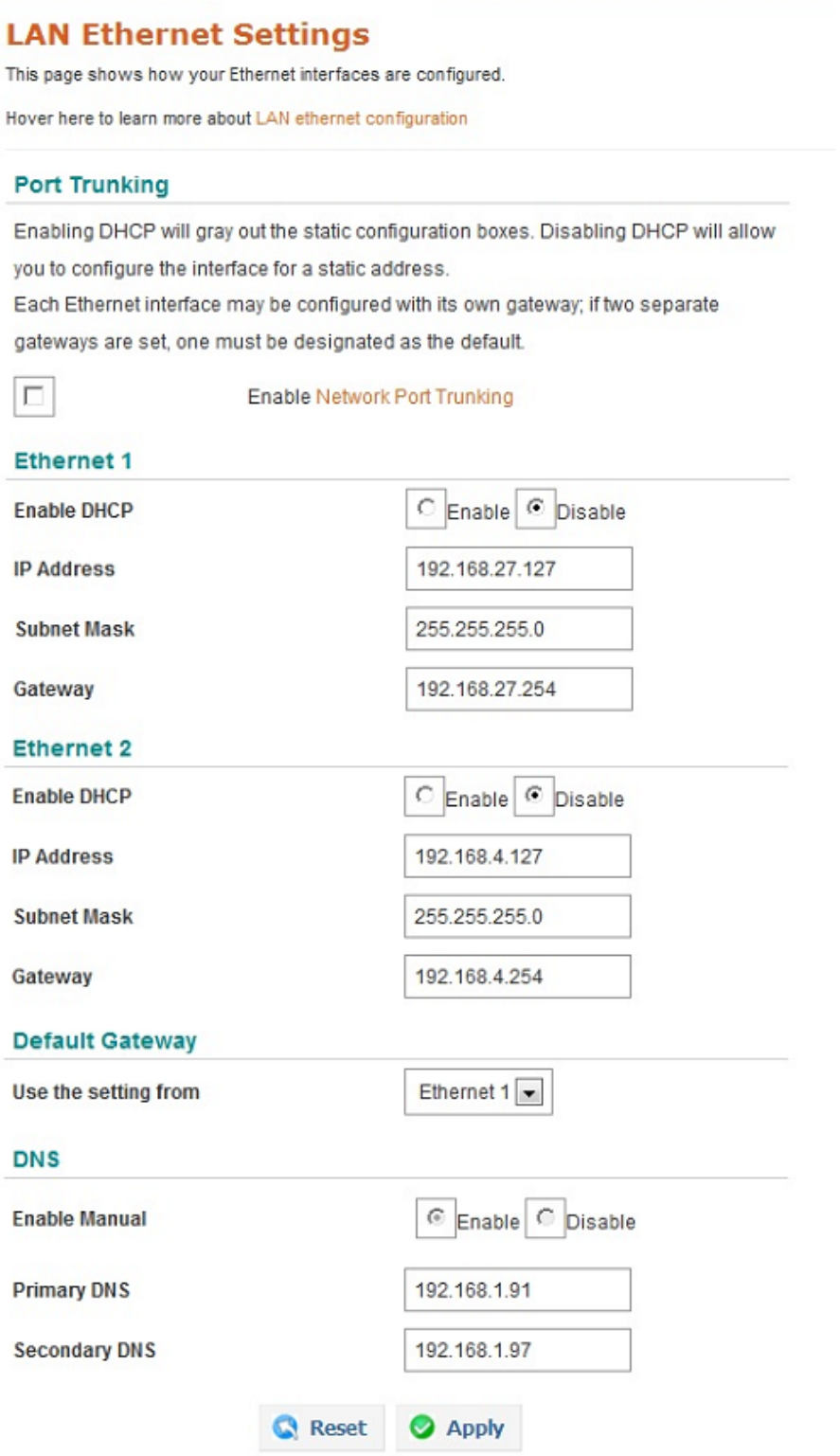
4. **Broadcast**
   This mode does not provide load balancing: both network interfaces are used to transmit identical packets. This provides high fault tolerance.

5. **IEEE 802.3ad (Dynamic Link Aggregation,** or **LACP)**
   This is the most reliable and effective interface bonding mode; it uses hashed protocol headers that enable it balance outgoing traffic across all active ports while allowing it to accept incoming traffic from any active port. **LACP** automatically creates aggregation groups that share the same speed and duplex settings. According to the standard, frames must be delivered in order and connections may not receive packets out of order. Minimal switch configuration is required.

6. **Balance-tlb (Adaptive Transmit Load Balancing)**
   This mode balances the outgoing traffic according to peer. Outgoing network traffic is distributed according to the current load (computed relative to the speed) on each network interface. Incoming traffic is not balanced: all incoming traffic is received by one designated network interface. If this receiving interface fails, the other will take over the MAC address of the failed receiver.

7. **Balance-alb (Adaptive Load Balancing)**
   This mode is essentially the same as **balance-tlb** but it also balances incoming traffic, as well. Balance-alb is *balance-tlb* plus *receive load balancing* (rlb). The bonding driver intercepts ARP replies sent by the local system (on their way out) and overwrites the source hardware address with the unique hardware address of an NIC in the logical interface so that different network-peers will use different MAC addresses for their network traffic. It does not require any special network switch support.

Overview of Ethernet LAN Settings



Ethernet 1 and **Ethernet 2:** These interfaces may be independently configured for either DHCP or static addressing. For static IP addresses, provide the address, subnet mask, and gateway information.

Default Gateway: In configurations where two gateways are configured, use this to select the interface you want to use as the default gateway. This may be left disabled if only one gateway is configured.

DNS: Check if you want to manually configure a DNS server.

When finished, click **Apply** to implement the configuration.

SNMP

To configure **SNMP**, navigate to the **NETWORK** tab, then to the SNMP tab, from which you may further select either **Basic** SNMP configuration, or **Trap** (to configure the settings for SNMP alarms and traps).

Basic SNMP Configuration

This allows users to configure basic SNMP settings.

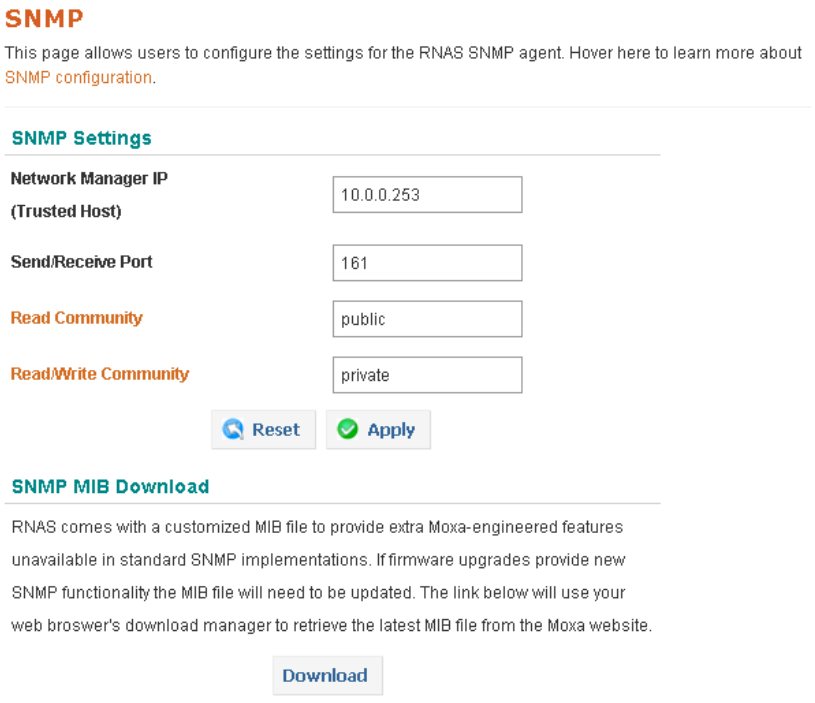
Network Manager IP: Provide the IP address for the network manager. This will be the IP address of the computer on which your network manager software (NMS) resides.

Send/Receive Port: Set the communication port over which SNMP data will be sent and received.

Read Community: This is the input box where you may change the **Read Community String**. The read community string is essentially a password that works as a security feature to make it harder for anonymous, untrusted systems to read data from the local device.

The default string is **Public**; this is the setting which all SNMP devices default to, and it will allow any computer to read data from the local device. *To provide the most basic level of security, Moxa strongly advises changing the read community string.* Users should build a virtual network of privately connected devices by configuring the NMS and the group of networked SNMP agents with a strong read string. On the RNAS-1200, this is done by inputting your chosen string into the **Read Community** input box and clicking **Apply**.

Read/Write Community: This is the input box where you may change the string that identifies the **Read/Write Community**. The read/write community string is essentially a password that works as a security feature to make it harder for anonymous, untrusted systems to read ***or write*** data from/to the local device. By configuring a private, undisclosed read/write community string among an NMS and a group of networked SNMP agents, a network of trusted peers that may read and write information to one another is created.


SNMP
This page allows users to configure the settings for the RNAS SNMP agent. Hover here to learn more about SNMP configuration.
SNMP Settings
Network Manager IP (Trusted Host)
10.0.0.253
Send/Receive Port
161
Read Community
public
Read/Write Community
private
Reset
Apply
SNMP MIB Download
RNAS comes with a customized MIB file to provide extra Moxa-engineered features unavailable in standard SNMP implementations. If firmware upgrades provide new SNMP functionality the MIB file will need to be updated. The link below will use your web broswer's download manager to retrieve the latest MIB file from the Moxa website.
Download

Moxa strongly recommends changing the read/write community to a cryptographically strong, private key. **Public** is the default, and this will allow any computer to read and write data from the local device. To set up a cryptographically strong private string on the RNAS-1200, enter your chosen string into the **Read/Write Community** input box and click **Apply**.

IMPORTANT!

Strong cryptographic strings should be at least 8 random characters (i.e., not in a dictionary) and include capitalized letters and symbols. Do not forget to store your community keys in a secure location.

SNMP MIB Download

The RNAS-1200 comes with two MIB files: a standard RFC 1213 **MIB-II** file, and a custom **Moxa MIB file**. Our custom MIB file provides extra features for our RNAS users that include increased interoperability for scripts and custom software, as well as custom control features for better remote management.

As new features are created, Moxa's proprietary MIB file will occasionally need to be updated. To get the latest MIB file from the Moxa website, simply click **Download** (at the bottom of the page, in the screenshot above) to download the file to your local computer.

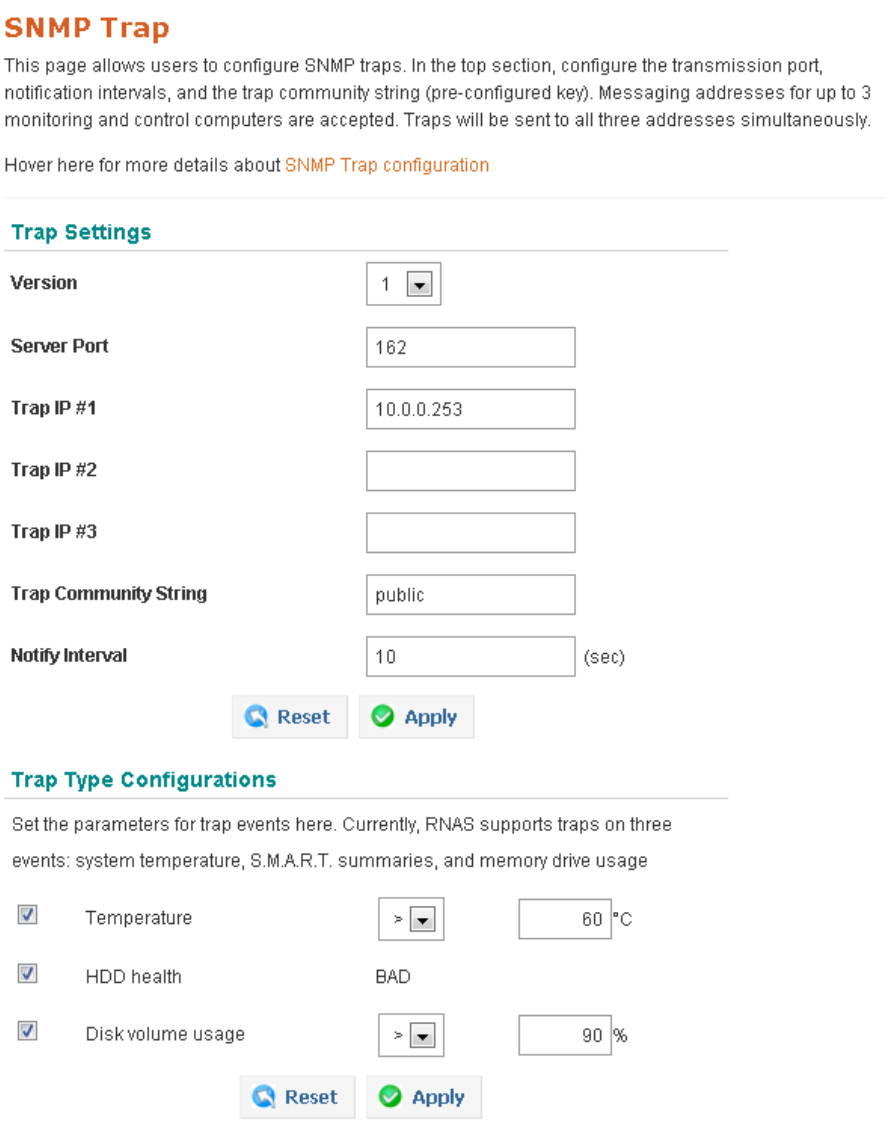
SNMP Traps

This page allows users to configure SNMP trap types and settings (screenshot on following page).

In **Trap Settings**, you may choose to set the following parameters:

- **Version**: Select the SNMP version by which your traps will be defined. This is an available option for systems compatible only with traps as defined in SNMP v1.
- **Server Port**: Enter the number of the port through which your SNMP agent and NMS will communicate.
- **Trap IP** (**#1** to **#3**): Enter the IP addresses to which the traps will be delivered; up to three different SNMP clients are allowed.
- **Trap Community String**: Enter either public or private for the trap community string.
- **Notify Interval**: Enter the interval time for sending the notification SNMP trap message to the trap IP address.

When finished, click Apply to complete the configurations.



The RNAS-1200 supports traps for three types of events: system temperature, hard drive health status (using S.M.A.R.T. summaries), and disk volume usage. Users may configure these settings according to their specific purposes. When finished, click **Apply** to complete.

MIB-II Overview

MIB-II is the second version of the SNMP management information base, as defined by RFC 1213-MIB. MIB-II is a standardized hierarchical database of programming objects that form the basic group of management tools that every device running SNMP must share. These objects define what information is accessible using SNMP.

The following table gives a brief description of MIB-II groups. For more detailed explanations, please refer to RFC 1213, which gives detailed definitions and parameters for all basic OIDs and OID groups in MIB-II.

Subtree Name	OID	Description
system	*1.3.6.1.2.1.1*	The system group is a list of objects that relate to system processes such as uptime, contact, and name.
interfaces	*1.3.6.1.2.1.2*	The interfaces group manages and monitors the status of data interfaces, reporting on interface status, or reporting activity such as octets sent and received, errors, discards, and the like.
at	*1.3.6.1.2.1.3*	The address translation (at) group should be considered a legacy component included only for backward compatibility. It is planned on being eliminated from MIB-III.
ip	*1.3.6.1.2.1.4*	The IP group provides management objects for monitoring, reporting,

		and controlling many elements of IP and IP routing.
icmp	*1.3.6.1.2.1.5*	The ICMP group monitors internal system reports of IP errors, discards, and the like.
tcp	*1.3.6.1.2.1.6*	This group reports on TCP states, returning whether the interface is closed, listening, synSent, and so forth.
udp	*1.3.6.1.2.1.7*	The UDP group returns statistics on UDP performance.
egp	*1.3.6.1.2.1.8*	The EGP group provides objects useful for EGP monitoring, like an EGP neighbor table.
transmission	*1.3.6.1.2.1.10*	MIB-I lacked any way of distinguishing types of transmission media. While the transmission group currently has no defined objects, this subtree allows the creation of media-specific MIBs. When Internet-standard definitions for managing transmission media are defined, the transmission group is used to provide a prefix for the names of those objects.
snmp	*1.3.6.1.2.1.11*	The SNMP group measures SNMP performance on the local device by logging and calculating such things as the number of SNMP packets sent and received.

For more information, visit http://www.ietf.org/rfc/rfc1213.txt, or refer to the O'Reilly book, *Essential SNMP*, available for free viewing online.

Moxa's SNMP Control Interface

The RNAS-1200 comes with a customized MIB file that provides a proprietary monitoring and control environment. This custom software utilizes SNMP to provide a much more convenient means of remotely controlling and monitoring a device. Using Moxa's SNMP control interface, you may create custom automations for most RNAS-1200 processes by calling SNMP objects in simple, standardized shell scripts.

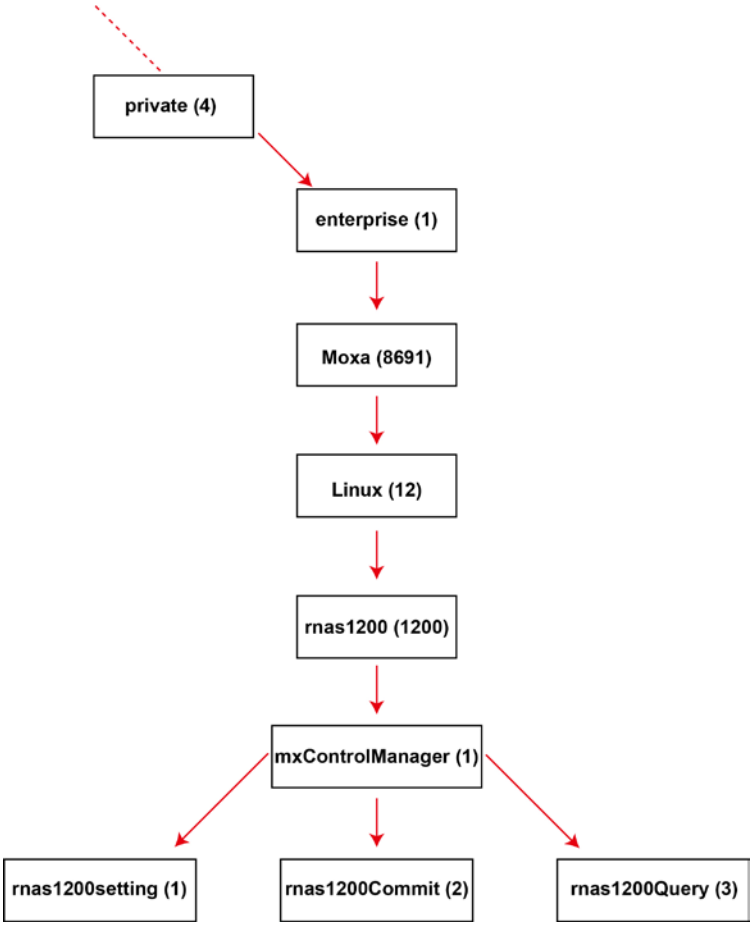
Brief Introduction

Refer to the following base OIDs for the RNAS-1200 MIB subtree.

```
Moxa              MODULE-IDENTITY    ::= { enterprises      8691}
Linux             OBJECT IDENTIFIER  ::= { moxa             12  }
rnas1200          OBJECT IDENTIFIER  ::= { Linux            1200 }
mxControlManager  OBJECT IDENTIFIER  ::= { rnas1200         1   }
rnas1200Setting   OBJECT-TYPE        ::= { mxControlManager 1   }
rnas1200Commit    OBJECT-TYPE        ::= { mxControlManager 2   }
rnas1200Query     OBJECT-TYPE        ::= { mxControlManager 3   }
```

Finally, keep in mind that for many NMS implementations, all OIDs must be appended with a final value indicating whether it is a **scalar** value (0), or a **columnar** value (i.e., a simple table). While some NMS suites do allow the final **.0** to be dropped, it is good practice to include these values in your SNMP commands. Currently, all of Moxa's proprietary OIDs are scalar values, and so should be completed with a final zero (**.0**).

Below, a simple SNMP tree showing the relationships between the Moxa enterprise OIDs is provided.



rnas1200Setting

- A scalar SNMP object used to import the RNAS-1200 settings.
- **OID: 1.3.6.1.4.1.8691.12.1200.1.1.0**
- **Note:** Imported items are stored in RAM for up to 15 minutes. All imported values are committed to the database in bulk by setting the **rnas1200Commit** data string to '1'. For a better understanding of the settings query and commit process, please **refer to the examples below** for clarification on the syntax and full procedure.
- **Input Syntax:** **[RESOURCE_IDENTIFIER]=[VALUE]**
  Ex: **systemResources.hostname.1=MOXA**
- **Output Result:** Since the object is read-only, if you're trying to get this object, you'll get the string **Not available**.

rnas1200Commit

- A scalar SNMP object used to commit all settings which have been imported by the 'rnas1200Setting' object.
- **OID: 1.3.6.1.4.1.8691.12.1200.1.2.0**
- **Input Syntax:** 1 = Commit all settings to the database
- **Output Result:** 0 = The commit was successfully written to the database
  1 = The commit failed because the database was busy. When a commit has failed, the RNAS-1200 settings will be erased from memory and must be reloaded before the commit may be attempted again. See the example below, Acquiring and Committing RNAS Settings, for more details about this process.

rnas1200Query

- A scalar SNMP object used to query an RNAS-1200 RESOURCE_IDENTIFIER. For a full list of resources available for queries, refer to the table below, SNMP Resource Identifiers for Moxa's SNMP Control Interface.
- **OID: 1.3.6.1.4.1.8691.12.1200.1.3.0**
- **Input Syntax:** [RESOURCE_IDENTIFIER]
  Ex: systemResources.hostname.1
- **Output Result:** [RESOURCE_VALUE]
  Ex: MOXA

Moxa SNMP Control Interface: Usage Examples

There are many SNMP suites, and all may be used more-or-less interchangeably. In the following example, we use Net-SNMP syntax to demonstrate how to use SNMP to acquire information from and remotely manage a device.

Moxa's proprietary MIB file implements a heavily modified version of Net-SNMP that is not always intuitive. This is because Moxa's SNMP controls are the view layer (i.e., the user interface) of a larger MVC software framework. The model layer of this framework is a transparent database with which the SNMP controls interact. Thus, when the proprietary OID **rnas1200Query** (**1.3.6.1.4.1.8691.12.1200.1.3.0**) is called, the returned resource and its associated value are being read from the relational database which forms the model layer within the framework. When the **rnas1200Commit** (**1.3.6.1.4.1.8691.12.1200.1.2.0**) object is called, the related resource and value are not being written directly to the system, but are instead written to the relational database in which all system information is stored. This database is constantly being monitored by control layer, so that when a new write to the database is completed the framework's control layer will automatically and immediately implement the changes in the root system.

Consequently, when using Moxa's proprietary MIB file to control, monitor, and manage system processes, the syntax used is slightly different than with a stock Net-SNMP implementation. Because the resources available for management and monitoring are stored in a relational database, SNMP does not call them directly from the root system. Instead, they are referenced as paired strings of database objects. The following example gives a basic idea of the modified syntax; notice the data type is **s**, for **STRING**:

#**snmpset** [COMMAND_OPTIONS] [IP_ADDRESS] [OID] [DATA_TYPE: **s**, for **STRING**] / [RESOURCE_IDENTIFIER=RESOURCE_VALUE]

When considering this example (and the ones below), new users of SNMP should make two notes. First, in standard Net-SNMP syntax, OID data types are defined by tags; these tags are distinct from the command options which modify the basic SNMP command. Common command options are delimited by hyphens (-v, -c, -x, etc), while OID data types (**i** for **INTEGER, s** for **STRING, d** for **DECIMAL_STRING,** etc) are **not** delimited by hyphens. In the three examples immediately below, the **s** delimiter is used to indicate that the OID data type is a **STRING**.

Second, when calling an OID, a final number called the **instance identifier** is sometimes appended to indicate whether the OID being called is a **scalar** value or is retrieving a value from within a **columnar** table. For Moxa's current implementation of the RNAS SNMP controls, all values are scalar. Thus, in all the following examples all the instance identifiers are zero. For instance, the OID for acquiring RNAS-1200 settings is **1.3.6.1.4.1.8691.12.1200.1.1**. To indicate that this is a scalar value, the instance identifier of zero may be appended to the OID, so that the completed OID is written **1.3.6.1.4.1.8691.12.1200.1.1.0**. While the final instance identifier is not always required by NMS systems, for many it remains a required parameter and so Moxa includes it here as an example of best practices.

Scenario A: Acquire and Commit RNAS Settings

Acquiring and committing RNAS settings is a two step process: loading a setting into memory using **snmpset** + the **rnas1200Setting** resource identifier OID, and then committing that setting using **snmpset** with the **rnas1200Commit** resource identifier OID.

Step 1: Use the **snmpset** command to import items which you want to configure. Please note: to import more than one item, use multiple commands. Imported settings will be stored in RAM for up to 15 minutes. *If the imported settings are not committed to the database within 15 minutes, they will be purged from memory.*

#**snmpset –v** [SNMP_VERSION] **–c** [RW_COMMUNITY] [IP_ADDRESS] [rnas1200Setting OID]

[DATA_TYPE] [RESOURCE_NAME=RESOURCE_VALUE]

```
root@tmp# snmpset –v 2c –c admin 192.168.27.231 1.3.6.1.4.1.8691.12.1200.1.1.0 / s
“systemResources.hostname.1=MOXARNAS”
```

Step 2: Commit all the items you have just imported. Please note that you may use multiple commands to import more than one item. By toggling the OID data string to 1 (….**s “1”**), all imported items may be committed to the database in a single operation.

#snmpset –v [SNMP_VERSION] **–c** [RW_COMMUNITY] [IP_ADDRESS] [rnas1200Commit OID] [DATA_TYPE] [TOGGLE]

```
root@tmp# snmpset –v 2c –c admin 192.168.27.231 1.3.6.1.4.1.8691.12.1200.1.2.0 / s
“1”
```

Scenario B: Retrieve System Information

Retrieving system information consists of two parts: loading the information into system memory using **snmpset + rnas1200Query** resource indentifier OID, and displaying that information using **snmpget + rnas1200Query** resource indentifier OID.

Step 1: Use **snmpset** to select the item which you want to query. This command will only load the resource value into memory; to display it, you must use the **snmpget** command, below. Only one resource may be stored in RAM at any given time. If multiple resources are called in sequence, only the last resource called will be available for display using **snmpget** (see step 2, below).

#**snmpset –v** [SNMP_VERSION] **–c** [RW_COMMUNITY] [IP_ADDRESS] [OID] [DATA_TYPE] [RESOURCE]

```
root@tmp# snmpset –v 2c –c admin 192.168.27.231 1.3.6.1.4.1.8691.12.1200.1.3.0 / s
“systemResources.hostname.1”
```

Step 2: Use **snmpget** to return the value of the object you have selected. *This operation will only return the value most recently acquired by the query operation just above, in step 1*. If no resource has been acquired, yet, the command will return null.

#**snmpget –v** [SNMP_VERSION] **–c** [RW_COMMUNITY] [OID]

```
root@tmp# snmpget –v 2c –c admin 192.168.27.231 1.3.6.1.4.1.8691.12.1200.1.3.0
```

SNMP Resource Identifiers for Moxa's SNMP Control Interface

Hostname

Item Name	Item Description	Value Description	Rules for value
systemResources.hostname.1	System hostname.	*(Any String)*	Up to 45 characters

Web Server

Item Name	Item Description	Value Description	Rules for value
webServerResources.password.1	Web server's password.	*(Any String)*	Up to 40 characters
webServerResources.port.1	TCP/IP port on which the web server listens.	*(IP address)*	

Service Management

Item Name	Item Description	Value Description	Rules for value
serviceResources.enable.1	Enables/disables the **ftp server.**	***0*** *: Disable* ***1*** *: Enable*	
serviceResources.enable.2	Enables/disables the **ssh server**.	***0*** *: Disable* ***1*** *: Enable*	

SNMP Agent (Basic)

Item Name	Item Description	Value Description	Rules for value
snmpServerResources.trustHostIp.1	The IP address of the network manager (the **Trusted Host**) to which the SNMP agent reports.	*(IP Address)*	
snmpServerResources.port.1	The port over which the SNMP agent will listen and report.	*(Any Number)*	Any port up to 65535
snmpServerResources.readCommunity.1	**Read Community String.**	*(Any String)*	Up to 32 characters
snmpServerResources.readWriteCommunity.1	**Read/Write Community String**.	*(Any String)*	Up to 32 characters

SNMP Agent (Trap)

Item Name	Item Description	Value Description	Rules for value
snmpTrapResources.version.1	The SNMP.version	***1*** *: first version* ***2c*** *: second version*	
snmpTrapResources.serverPort.1	The port used by SNMP traps	*(Any Number)*	Less than 65535
snmpTrapResources.trustTrapIp0.1	Trusted IP #1	*(IP Address)*	
snmpTrapResources.trustTrapIp1.1	Trusted IP #2	*(IP Address)*	
snmpTrapResources.trustTrapIp2.1	Trusted IP #3	*(IP Address)*	
snmpTrapResources.community.1	The **Trap Community String**	*(Any String)*	Less than 30 characters
snmpTrapResources.notifyInterval.1	Notify interval for SNMP informs	*(Any Number) (sec)*	Only available in 1 ~ 10000

DNS Management

Item Name	Item Description	Value Description	Rules for value
dnsResources.enableManual.1	To enable/disable manual DNS. settings	***0*** *: Disable* ***1*** *: Enable*	
dnsContainer.ip.1	The default DNS IP address	*(IP Address)*	
dnsContainer.ip.2	The alternate DNS IP address	*(IP Address)*	

System Log

Item Name	Item Description	Value Description	Rules for value
systemLogResources.maxRecord.1	The max. quantity of records.	*(Any Num)*	Anything up to 65535.

Network Management

Item Name	Item Description	Value Description	Rules for value
Ethernet1 (eth0)			
networkResources.ip.1	IP of Ethernet 1.	*(IP Address)*	
networkResources.subnet.1	Netmask of Ethernet 1	*(Netmask)*	
networkResources.gateway.1	Gateway of Ethernet 1.	*(IP Address of Gateway)*	
networkResources.defaultGateway.1	Set default gateway for Ethernet 1	***0*** *: Disable* ***1*** *: Enable*	
networkResources.enableDHCP.1	Enable/disable DHCP for Ethernet 1	***0*** *: Disable* ***1*** *: Enable*	
Ethernet2 (eth1)			
networkResources.ip.2	IP of Ethernet2.	*(IP Address)*	
networkResources.subnet.2	Netmask of Ethernet2.	*(Netmask)*	
networkResources.gateway.2	Gateway of Ethernet2.	*(IP Address of Gateway)*	
networkResources.defaultGateway.2	Set Ethernet 2 default gateway	***0*** *: Disable* ***1*** *: Enable*	
networkResources.enableDHCP.2	Enable/disable DHCP for Ethernet 2.	***0*** *: Disable* ***1*** *: Enable*	
IP Bonding1 (bond0)			
networkResources.ip.3	IP of logical bond	*(IP Address)*	
networkResources.subnet.3	Netmask of logical bond	*(Netmask)*	
networkResources.gateway.3	Gateway for logical bond	*(IP Address of Gateway)*	
networkResources.defaultGateway.3	Set gateway of logical bond	***0*** *: Disable* ***1*** *: Enable*	
networkResources.enableDHCP.3	To enable/disable DHCP for logical bond	***0*** *: Disable* ***1*** *: Enable*	
trunkResources.enableTrunking.1	To enable/disable IP bonding (trunking).	***0*** *: Disable* ***1*** *: Enable*	
trunkResources.trunkingMode.1	Select the IP bonding mode of (trunking).	***0*** *: Balance-RR mode* ***1*** *: Active Backup* ***2*** *: Balance-XOR* ***3*** *: Broadcast* ***4*** *: IEEE 802.3ad* ***5*** *: Balance-TLB* ***6*** *: Balance-ALB*	

NOTE If IP bonding is enabled, any network settings configured for Ethernet 1 and Ethernet 2 will have no effect.

Time Management

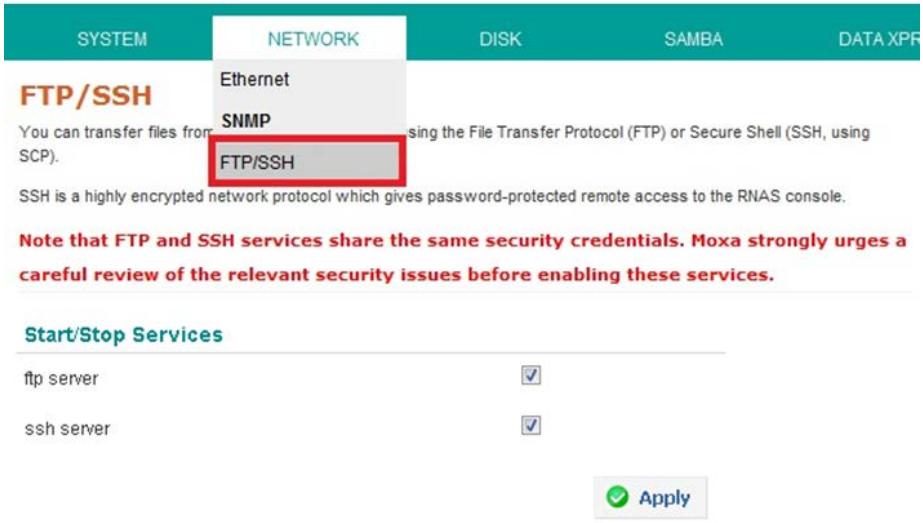
Item Name	Item Description	Value Description	Rules for value
timeResources.enableNTP.1	Enable/disable NTP server queries	***0*** *: Disable* ***1*** *: Enable*	
timeResources.updateNTPInterval.1	NTP update frequency	*(Any Number) (sec)*	
timeResources.ntpServerIp.1	The IP of NTP server.	*(IP Address)*	
timeResources.displayFormat.1	Select the time format	***0*** *: 24H format* ***1*** *: 12H format*	Less than 36.

Time Zones

timezoneResources.countryDLS.1	***GMT+12 :*** *-12:00,0 GMT+12* ***Samoa :*** *-11:00,0 SST* ***Hawaii :*** *-10:00,0 HST* ***Alaska :*** *-09:00,1 AKDT* ***Pacific :*** *-08:00,1 PDT* ***Arizona :*** *-07:00,0 MST* ***Mountain :*** *-07:00,1 MDT* ***Saskatchewan :*** *-06:00,0 CST* ***Central :*** *-06:00,1 CDT* ***Bogota :*** *-05:00,0 COT* ***Eastern :*** *-05:00,1 EDT* ***Manaus :*** *-04:00,1 AMT* ***Caracas :*** *-04:00,0 VET* ***Bangkok :*** *+07:00,0 ICT* ***Taipei :*** *+08:00,0 CST* ***Irkutsk :*** *+08:00,1 IRKST* ***Yakutsk :*** *+09:00,1 YAKST*	***Newfoundland :*** *-03:30,1 NDT* ***Montevideo :*** *-03:00,1 UYT* ***Buenos_Aires :*** *-03:00,0 ART* ***Noronha :*** *-02:00,1 FNT* ***Azores :*** *-01:00,1 AZ OST* ***Cape_Verde :*** *-01:00,0 CVT* ***Casablanca :*** *-00:00,0 WET* ***London :*** *-00:00,1 BST* ***Amsterdam :*** *+01:00,1 CEST* ***Gaborone :*** *+01:00,0 CAT* ***Amman :*** *+02:00,1 EET* ***Harare :*** *+02:00,0 CAT* ***Baghdad :*** *+03:00,1 AST* ***Tokyo :*** *+09:00,0 JST* ***Darwin :*** *+09:30,0 CST* ***Adelaide :*** *+09:30,1 CST* ***Brisbane :*** *+10:00,0 EST*	***Kuwait :*** *+03:00,0 AST* ***Tehran :*** *+03:30,0 IRDT* ***Muscat :*** *+04:00,0 GST* ***Baku :*** *+04:00,1 AZST* ***Kabul :*** *+04:30,0 AFT* ***Oral :*** *+05:00,1 ORAT* ***Karachi :*** *+05:00,0 PKT* ***Kolkata :*** *+05:30,0 IST* ***Katmandu :*** *+05:45,0 NPT* ***Dhaka :*** *+06:00,0 BDT* ***Almaty :*** *+06:00,1 ALMT* ***Rangoon :*** *+06:30,0 MMT* ***Krasnoyarsk :*** *+07:00,1 KRAST* ***Canberra :*** *+10:00,1 EST* ***Magadan :*** *+11:00,0 MAGST* ***Auckland :*** *+12:00,1NZDT* ***Fiji :*** *+12:00,0 FJT* ***Tongatapu :*** *+13:00,0 TOT*

FTP / SSH

The RNAS-1200 comes with SSH and FTP disabled by default. This page will allow users to enable and disable the FTP and SSH servers. If you would like to enable the FTP or SSH server, check the box next to the appropriate entry and click **Apply** to complete.


SYSTEM
NETWORK
DISK
SAMBA
DATA XPR
Ethernet
SNMP
FTP/SSH
FTP/SSH
You can transfer files from
sing the File Transfer Protocol (FTP) or Secure Shell (SSH, using SCP).
SSH is a highly encrypted network protocol which gives password-protected remote access to the RNAS console.
Note that FTP and SSH services share the same security credentials. Moxa strongly urges a careful review of the relevant security issues before enabling these services.
Start/Stop Services
ftp server
ssh server
Apply

WARNING

The SSH server does not come with any implemented security features. If you wish to enable the SSH server, Moxa strongly recommends a thorough and detailed reconfiguration of the SSH server's security settings before allowing the RNAS to go online.

The configuration file for the SSH server can be found at **`/etc/ssh/sshd_config`**. The default login and password for the SSH daemon are **`root/root`**. ***Moxa strongly recommends forbidding root logins over SSH.***

Detailed information on how to audit and reconfigure SSH security is available in many places online. The three links offered below are provided as suggestions, but because these are not Moxa-sponsored web pages no guarantee is offered as to their availability or accuracy. However, these are well-established pages maintained by the FOSS community and contain much useful advice. Users should their best judgment.

- The Official Debian Administration Blog.
- The private key authentication official "How-to": the unofficial Debian Wiki (maintained by Justin Hartman).
- The Official Debian Wiki entry on SSH:

The configuration files for the FTP server are located in /etc. For more information on configuring FTP, you may refer to the official Debian Wiki (http://wiki.debian.org) or the official Debian Administration Blog (http://www.debian-administration.org).

7

Managing Drives and Storage

The following topics are covered in this chapter:

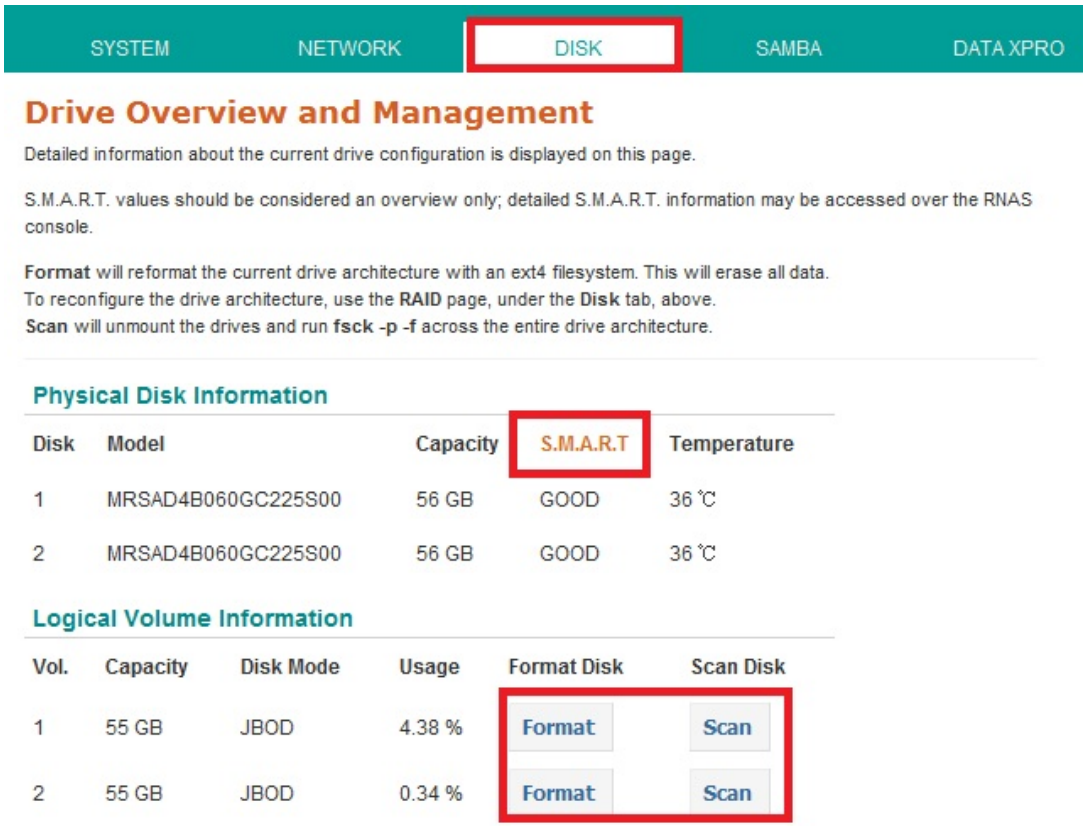
- **Checking Drive Status, Capacity, and Health**
  - S.M.A.R.T Information
  - Formatting Disks and Arrays
  - Scanning Disks and Arrays
  - Viewing Disk Volumes
  - Creating a Disk Volume
  - Enabling Disk Encryption

Checking Drive Status, Capacity, and Health

To see an overview of the system's drive stats, click on the **DISK** tab. On this page you may monitor the status, temperature, usage information, and total capacity of the storage drives, as well as get a full S.M.A.R.T. report on drive behavior. You may also perform low-level formatting and scanning of the drives.

WARNING

Only use the **Scan Disk** feature after carefully reviewing the manual page and the relevant command options. The **Scan** button will trigger the command **`#fsck -p -f`** across the entire drive architecture. If used improperly, or at the wrong time, this could seriously damage the logical file system and result in permanent data loss. In RAID architectures it could potentially erase data or break the RAID. For a detailed overview of the **`fsck`** command, refer to the Linux **fsck.ext4(8)** man page, at http://linux.die.net/man/8/fsck.ext4.


SYSTEM
NETWORK
DISK
SAMBA
DATA XPRO
Drive Overview and Management
Detailed information about the current drive configuration is displayed on this page.
S.M.A.R.T. values should be considered an overview only; detailed S.M.A.R.T. information may be accessed over the RNAS console.
Format will reformat the current drive architecture with an ext4 filesystem. This will erase all data.
To reconfigure the drive architecture, use the RAID page, under the Disk tab, above.
Scan will unmount the drives and run fsck -p -f across the entire drive architecture.
Physical Disk Information
Disk Model Capacity S.M.A.R.T Temperature
1 MRSAD4B060GC225S00 56 GB GOOD 36 ℃
2 MRSAD4B060GC225S00 56 GB GOOD 36 ℃
Logical Volume Information
Vol. Capacity Disk Mode Usage Format Disk Scan Disk
1 55 GB JBOD 4.38 % Format Scan
2 55 GB JBOD 0.34 % Format Scan

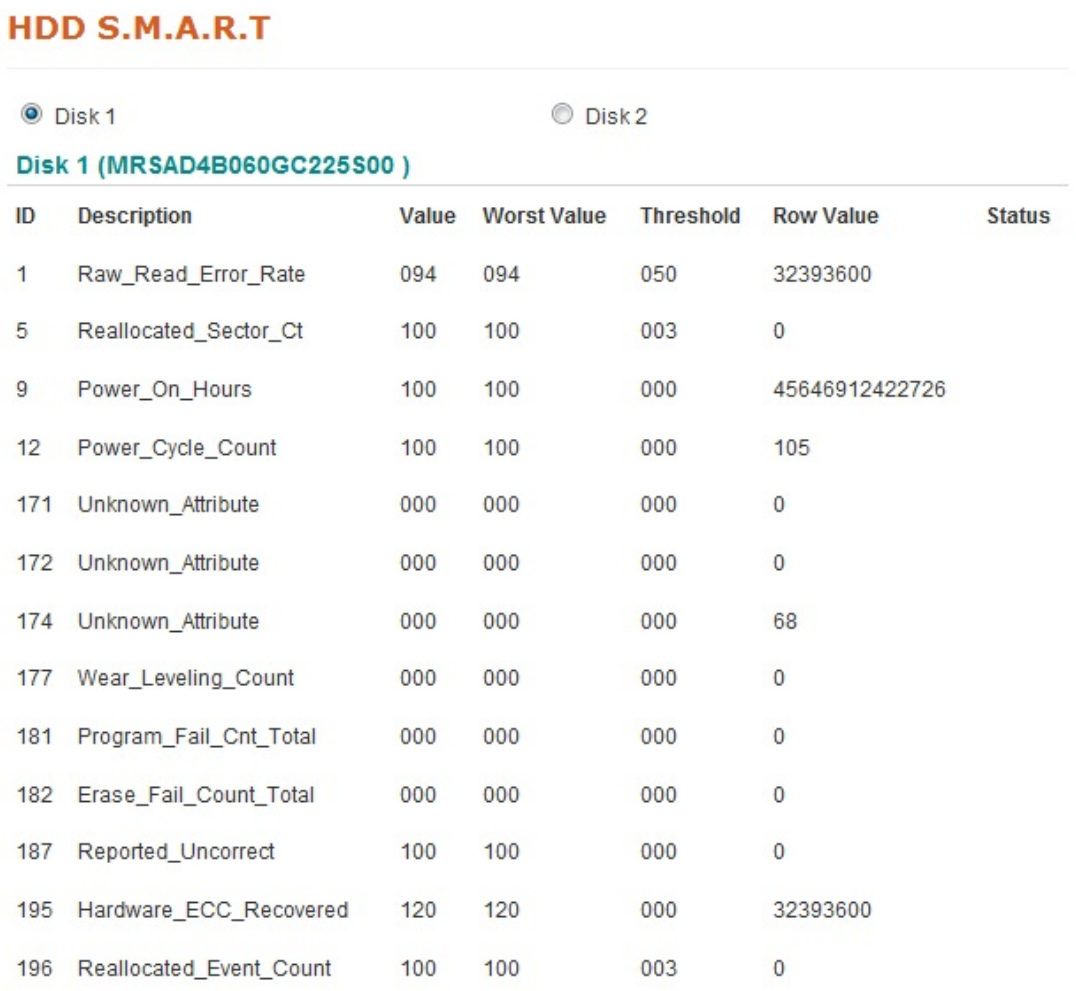
The **Format** button will reformat your drives with a clean ext4 file tree. How the file tree is written across the physical drives will depend on the architecture you configure under the **RAID** tab, **Creating a Disk Volume**.

IMPORTANT!

Formatting your drives will erase all data. Before reformatting your drives, make sure you have backed up any important data.

S.M.A.R.T Information

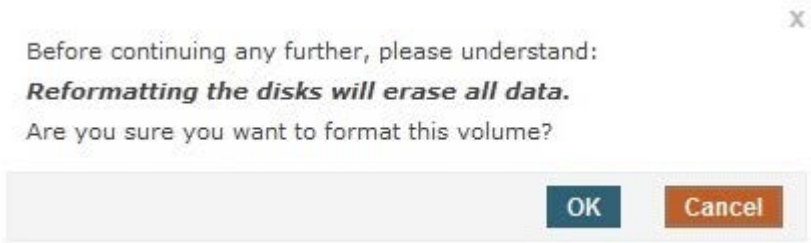
By clicking on the **S.M.A.R.T.** column header (located in the **Physical Drive Information** table) users can access a detailed report of hard drive hardware statistics and health. Select either **Disk 1** or **Disk 2** to view the specific drive. When finished, close the window.



ID	Description	Value	Worst Value	Threshold	Row Value	Status
1	Raw_Read_Error_Rate	094	094	050	32393600	
5	Reallocated_Sector_Ct	100	100	003	0	
9	Power_On_Hours	100	100	000	45646912422726	
12	Power_Cycle_Count	100	100	000	105	
171	Unknown_Attribute	000	000	000	0	
172	Unknown_Attribute	000	000	000	0	
174	Unknown_Attribute	000	000	000	68	
177	Wear_Leveling_Count	000	000	000	0	
181	Program_Fail_Cnt_Total	000	000	000	0	
182	Erase_Fail_Count_Total	000	000	000	0	
187	Reported_Uncorrect	100	100	000	0	
195	Hardware_ECC_Recovered	120	120	000	32393600	
196	Reallocated_Event_Count	100	100	003	0	

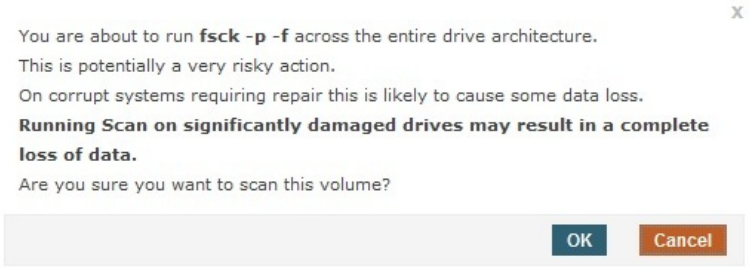
Formatting Disks and Arrays

By clicking **Format**, the selected drive will be automatically reformatted. **Please note that all the data on the disk will be erased and will not be recoverable.** A warning box will appear reminding you of this. If you wish to format the disk, click **OK**, or (if you're having second thoughts), **Cancel** to quit.


Before continuing any further, please understand:
Reformatting the disks will erase all data.
Are you sure you want to format this volume?
OK
Cancel

Scanning Disks and Arrays

Activating the **Scan** utility will unmount the drives and initiate a file tree scan of the entire file system by calling the **fsck** command. Fsck will be run using the **prune** (i.e., auto-repair) and **force** flags; these will automatically repair the file system (-p) and force (-f) a file system check even if the file tree appears clean. **Please note that scanning the disk may cause some unrecoverable data loss.** Click **OK** if you wish to scan the disk, or **Cancel** to quit.

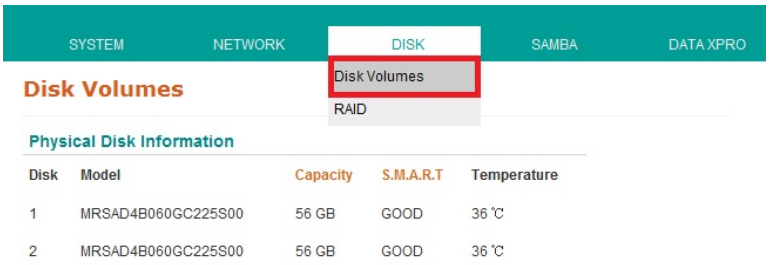

You are about to run fsck -p -f across the entire drive architecture.
This is potentially a very risky action.
On corrupt systems requiring repair this is likely to cause some data loss.
Running Scan on significantly damaged drives may result in a complete loss of data.
Are you sure you want to scan this volume?
OK
Cancel

ATTENTION

It is not always advisable to use the fsck utility, and when used improperly the command may irreversibly damage your system. Read up on proper fsck usage before putting it to use.

Viewing Disk Volumes

Click **Disk Volumes** from the **DISK** tab to view the disk volume stats.



Creating a Disk Volume

This is the section of the RNAS setup interface where you may configure a RAID architecture. To access the page, select **RAID** from within the **DISK** tab.

SYSTEM
NETWORK
DISK
SAMBA
DATA XPRO
Disk Volumes
RAID
RNAS Drive Architectures
On this page, you may configure the RNAS drive arch re offered: JBOD, BIG, RAID 0, and RAID 1.
For installations requiring high data security and drive reliability, Moxa recommends RAID 1 as the optimal configuartion.
JBOD
Enable disk encryption
JBOD means "Just a Bunch Of Drives". In this configuration, each memory drive is treated as an independent volume, with no collective properties of any kind. JBOD configurations offer standard performance with a standard failure rate and normal data security.
Apply

The following four RAID architectures are available:

JBOD

JBOD stands for "Just a Bunch Of Drives". In this configuration, each memory drive is treated as an independent volume, with no collective properties of any kind. JBOD configurations offer standard performance with a standard failure rate and normal data security.

Big

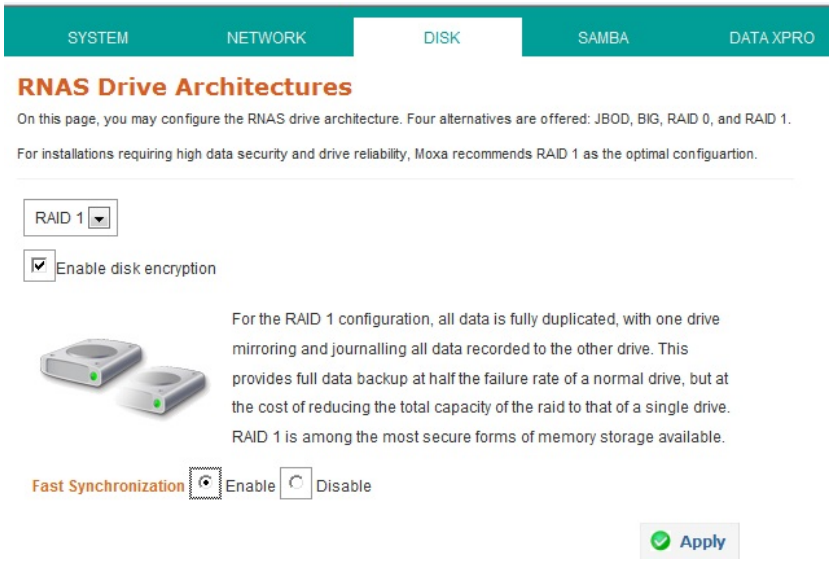
The BIG configuration is also called SPANNING. Both disks are concatenated together as if they were one single drive, or one very large logical volume. BIG is different from RAID 0 because there is no striping of data involved: each drive handles data at the file level, without any write or read sharing between devices. BIG configurations have no data redundancy, offer no increase in performance, and have a failure rate double that of JBOD. Alongside RAID 0, BIG/SPANNING configurations are significantly less reliable and secure than other configurations.

RAID 0

This configuration stripes data across two physical disks as if they were a single, larger disk. Because both disks operate as one, the read-write heads are doubled, providing much faster read-write times. However, there is no data redundancy, so if one drive fails all data across both disks will be lost, simultaneously. This effectively doubles the configuration's failure rate. RAID 0 provides a moderately increased read-write performance at a significant cost to reliability and security.

RAID 1

For the RAID 1 configuration, all data is fully duplicated, with one drive mirroring and journaling all data recorded to the other drive. This provides full data backup at half the failure rate of a normal drive, but at the cost of reducing the total capacity of the raid to that of a single drive. RAID 1 is among the most secure forms of memory storage available.


SYSTEM
NETWORK
DISK
SAMBA
DATA XPRO
RNAS Drive Architectures
On this page, you may configure the RNAS drive architecture. Four alternatives are offered: JBOD, BIG, RAID 0, and RAID 1.
For installations requiring high data security and drive reliability, Moxa recommends RAID 1 as the optimal configuartion.
RAID 1
Enable disk encryption
For the RAID 1 configuration, all data is fully duplicated, with one drive mirroring and journalling all data recorded to the other drive. This provides full data backup at half the failure rate of a normal drive, but at the cost of reducing the total capacity of the raid to that of a single drive. RAID 1 is among the most secure forms of memory storage available.
Fast Synchronization
Enable
Disable
Apply

In addition, for RAID 1 you may enable **Fast Synchronizations.** This is a recommended feature that is only meaningful in RAID 1 architectures. Fast synchronizations will come at a very slight cost to overall access speeds, a speed cost that in nearly all cases is negligible. Click **Apply** to implement. To read more about Moxa's fast synchronization technology, see Chapter 10, **Enabling Fast Synchronizations**.

ATTENTION

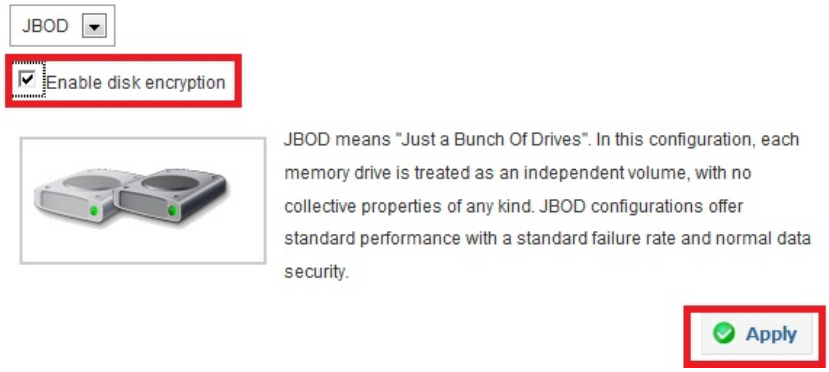
If you want to replace 1 HDD from the RNAS when RAID 1 is configured, the RNAS will continue to work only when a new HDD is inserted.

Enabling Disk Encryption

Data encryption at the drive level may only be enabled when configuring your drive architecture.

In addition, for a slight reduction in system access speeds you may enable **disk encryption**. This utility will use the 128 bit AES cipher and a unique, randomly generated key to transparently encrypt all data stored on your drive. Encrypting the drive in this way will mean that only the local RNAS-1200 system will be able to read the data from the drive.

When finished, click **Apply** to reformat your drives using your preferred RAID architecture. When building a drive array (or JBOD), the drives will be automatically reformatted with an ext4 file system. There will be no need to reformat the drives.


JBOD
Enable disk encryption
JBOD means "Just a Bunch Of Drives". In this configuration, each memory drive is treated as an independent volume, with no collective properties of any kind. JBOD configurations offer standard performance with a standard failure rate and normal data security.
Apply

IMPORTANT!

Changing the drive architecture will erase all data. Be sure to backup any important information before restructuring your drives.

8

SAMBA: Managing Users and Directories

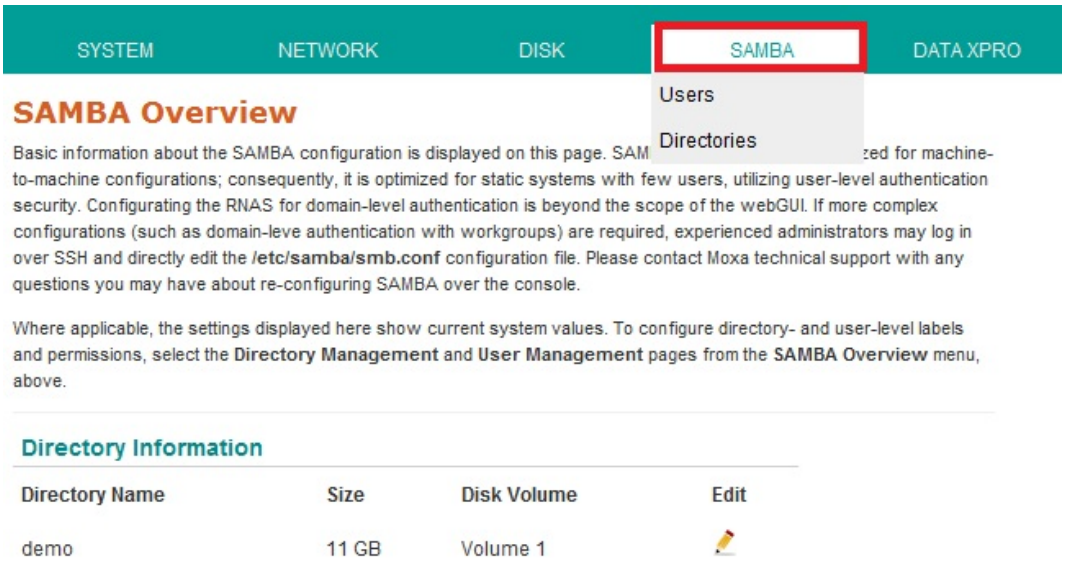
The following topics are covered in this chapter:

- **SAMBA**
  - Adding Users
  - User Accounts Management
  - Deleting Users
  - Creating Directories
  - Editing and Deleting Directories

SAMBA

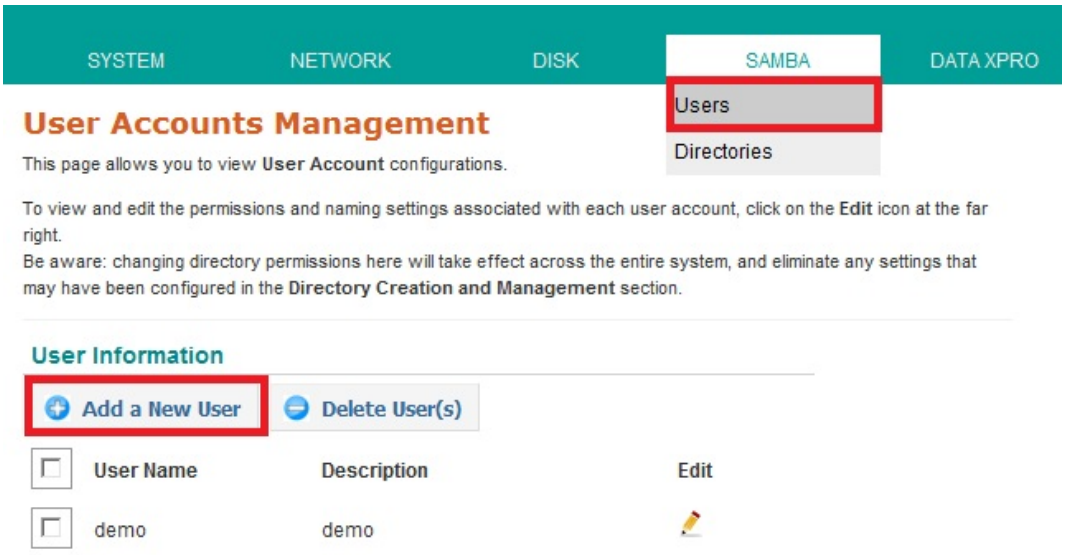
Samba is a FOSS implementation of Microsoft's SMB/CIFS networking protocol. Samba provides file and print services for Microsoft clients, allowing Unix and Linux systems to integrate with a Windows Server Domain or Active Directory domain as either a member or controller.

The Samba overview page is accessed by clicking on the **SAMBA** tab in the top ribbon. This page allows administrators to review the RNAS-1200's user accounts and shared directories.


SYSTEM
NETWORK
DISK
SAMBA
DATA XPRO
Users
Directories
SAMBA Overview
Basic information about the SAMBA configuration is displayed on this page. SAM
ed for machine-to-machine configurations; consequently, it is optimized for static systems with few users, utilizing user-level authentication security. Configurating the RNAS for domain-level authentication is beyond the scope of the webGUI. If more complex configurations (such as domain-leve authentication with workgroups) are required, experienced administrators may log in over SSH and directly edit the /etc/samba/smb.conf configuration file. Please contact Moxa technical support with any questions you may have about re-configuring SAMBA over the console.
Where applicable, the settings displayed here show current system values. To configure directory- and user-level labels and permissions, select the Directory Management and User Management pages from the SAMBA Overview menu, above.
Directory Information
Directory Name
Size
Disk Volume
Edit
demo
11 GB
Volume 1

Adding Users

To create new user accounts, navigate to the **Users** page using the **SAMBA** tab in the ribbon at the top of the page. Then click on the **Add a New User** button. This will take you to the user information and configuration page, **User Quotas and Permissions** (see next page).


SYSTEM
NETWORK
DISK
SAMBA
DATA XPRO
Users
Directories
User Accounts Management
This page allows you to view User Account configurations.
To view and edit the permissions and naming settings associated with each user account, click on the Edit icon at the far right.
Be aware: changing directory permissions here will take effect across the entire system, and eliminate any settings that may have been configured in the Directory Creation and Management section.
User Information
Add a New User
Delete User(s)
User Name
Description
Edit
demo
demo

User Quotas and Permissions

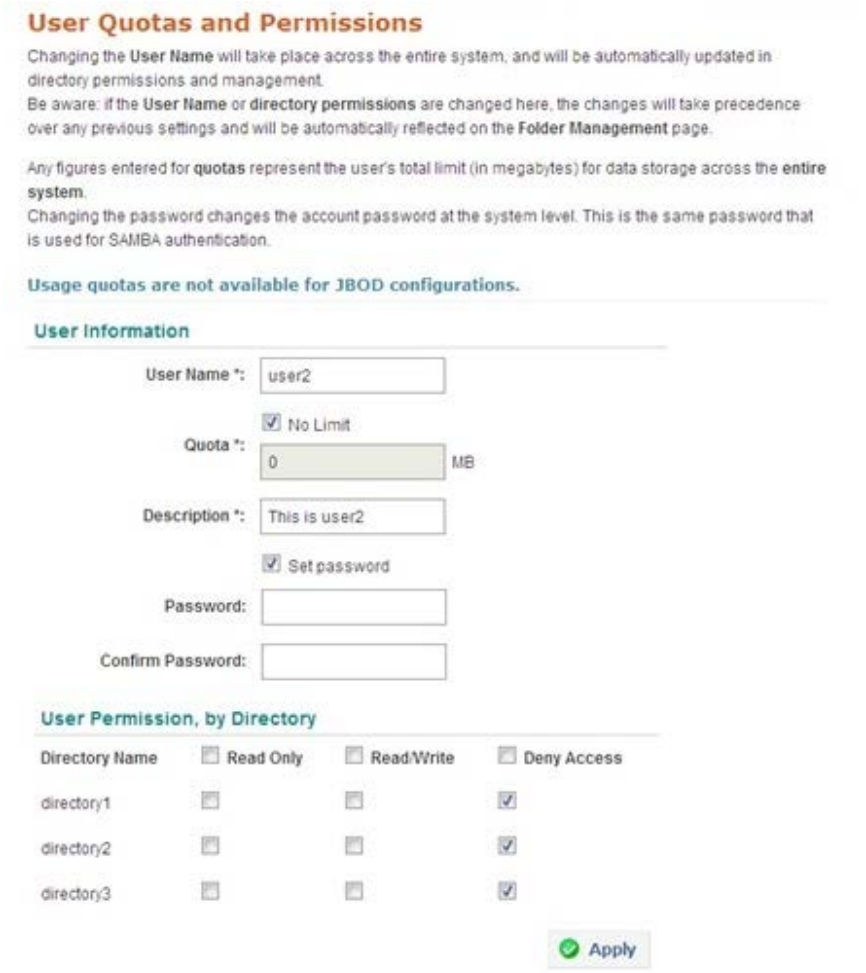
You may configure new user accounts on this page.

User Name: Provide the login name for the new account.

Quota: Set a storage limit for the new user. The storage quota is a percentage of the total file system capacity, and is not applied on a per-directory basis. Check **No Limit** if you do not want to set a quota for this account. Please note that the quota option is not available under JBOD status.

Description: Here, administrators may enter a short description of the account, to aid in management.

Password: To set a password for the user account, enter the password into the top box and then confirm it password by entering it again in the lower box. If you do not want to set a password for this user, uncheck the **Set password** toggle.


User Quotas and Permissions
Changing the User Name will take place across the entire system, and will be automatically updated in directory permissions and management.
Be aware: if the User Name or directory permissions are changed here, the changes will take precedence over any previous settings and will be automatically reflected on the Folder Management page.
Any figures entered for quotas represent the user's total limit (in megabytes) for data storage across the entire system.
Changing the password changes the account password at the system level. This is the same password that is used for SAMBA authentication.
Usage quotas are not available for JBOD configurations.
User Information
User Name *: user2
No Limit
Quota *: 0 MB
Description *: This is user2
Set password
Password:
Confirm Password:
User Permission, by Directory
Directory Name
Read Only
Read/Write
Deny Access
directory1
directory2
directory3
Apply

User Permissions, by Directory

This table allows you to configure directory permissions for each user. Three options are available: **Read Only**, **Read / Write**, and **Deny Access**.

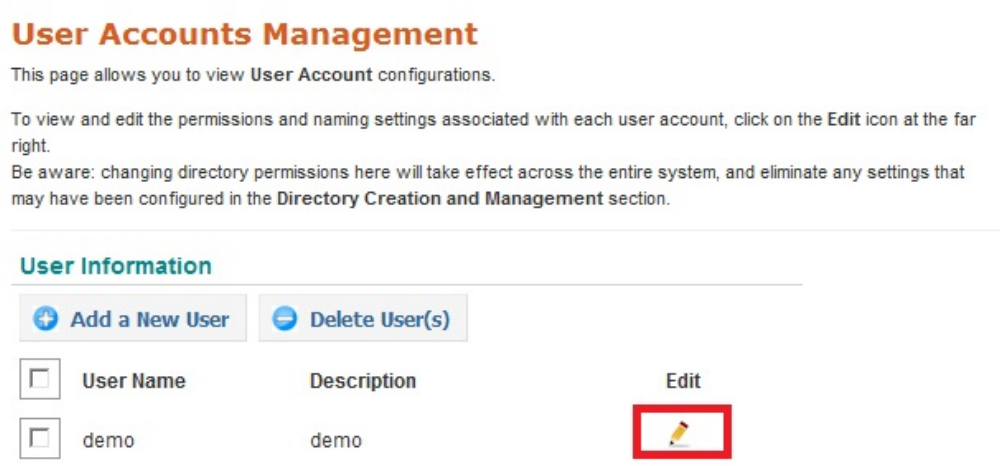
When finished, click **Apply** to complete the configuration.

ATTENTION

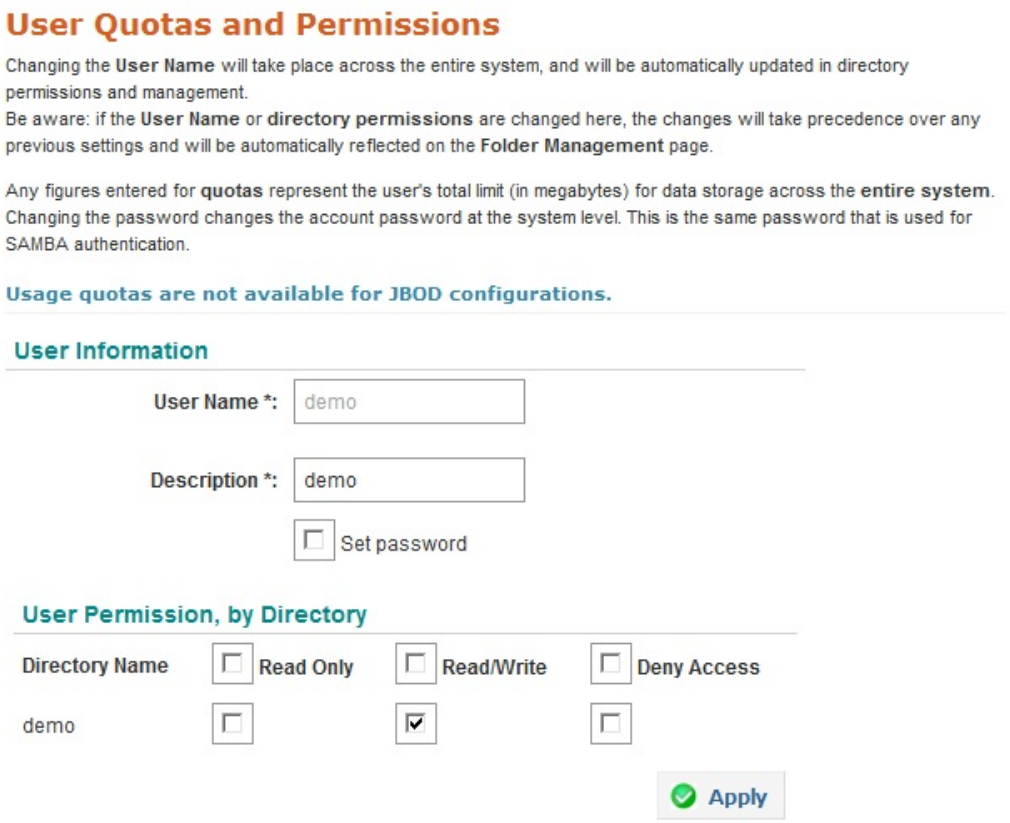
Any directory permissions that are changed in the **User Quotas and Permissions** page will be applied system wide. This means that any permissions that have been previously configured via the **Directory Labels and Permissions** page *will be overwritten* with the new values.

User Accounts Management

If you wish to make modifications to existing user accounts, click on the pencil icon next to the account's user name, in the **Edit** column.

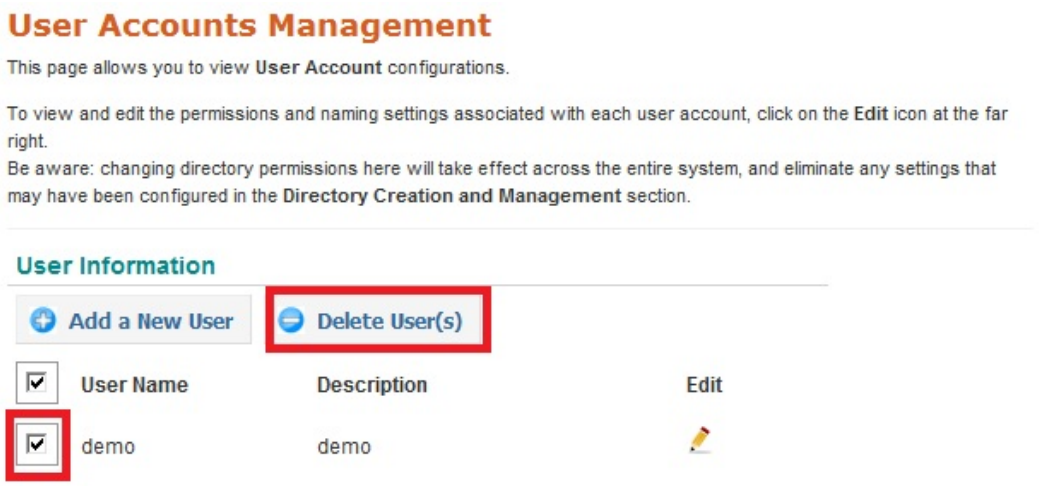

User Accounts Management
This page allows you to view User Account configurations.
To view and edit the permissions and naming settings associated with each user account, click on the Edit icon at the far right.
Be aware: changing directory permissions here will take effect across the entire system, and eliminate any settings that may have been configured in the Directory Creation and Management section.
User Information
Add a New User
Delete User(s)
User Name
Description
Edit
demo
demo

The user's information may be modified on the **User Quotas and Permissions** page.

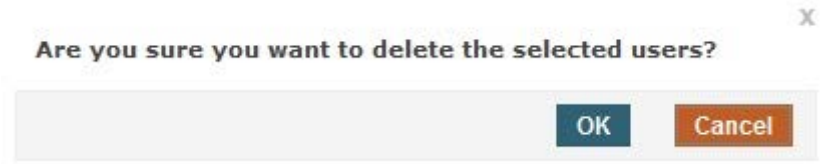

User Quotas and Permissions
Changing the User Name will take place across the entire system, and will be automatically updated in directory permissions and management.
Be aware: if the User Name or directory permissions are changed here, the changes will take precedence over any previous settings and will be automatically reflected on the Folder Management page.
Any figures entered for quotas represent the user's total limit (in megabytes) for data storage across the entire system.
Changing the password changes the account password at the system level. This is the same password that is used for SAMBA authentication.
Usage quotas are not available for JBOD configurations.
User Information
User Name *:
demo
Description *:
demo
Set password
User Permission, by Directory
Directory Name
Read Only
Read/Write
Deny Access
demo
Apply

Deleting Users

If you wish to delete a user, check the user name and click **Delete User(s)**.

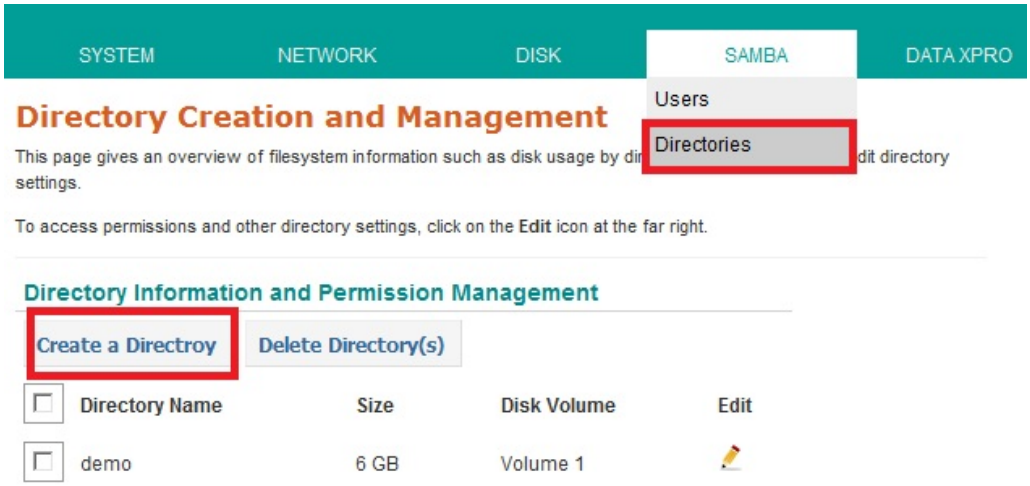

User Accounts Management
This page allows you to view User Account configurations.
To view and edit the permissions and naming settings associated with each user account, click on the Edit icon at the far right.
Be aware: changing directory permissions here will take effect across the entire system, and eliminate any settings that may have been configured in the Directory Creation and Management section.
User Information
Add a New User
Delete User(s)
User Name
Description
Edit
demo
demo

Click **OK** to confirm.



Creating Directories

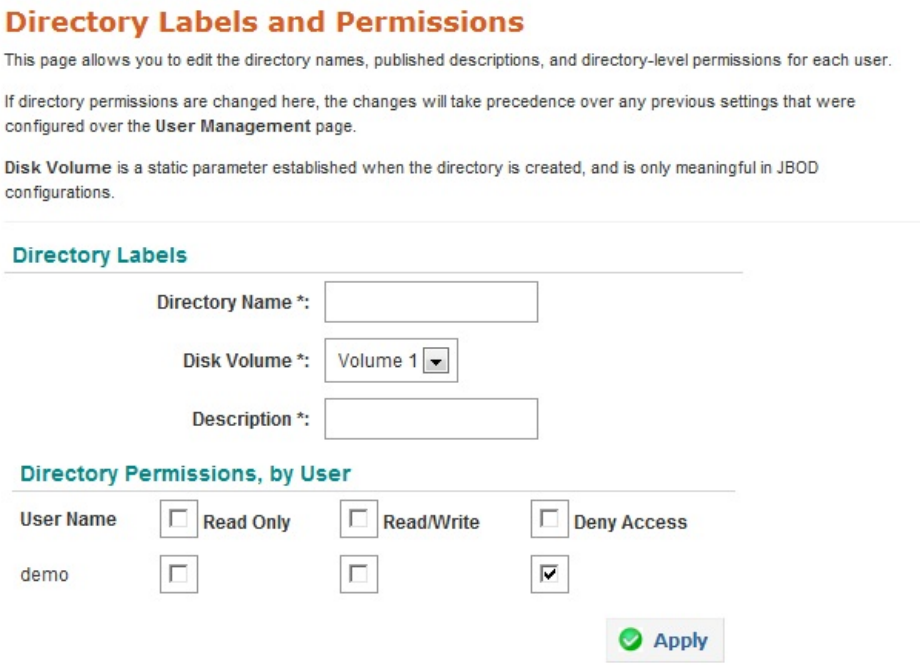
If you would like to create a directory on the RNAS-1200, click **Directories** from the **SAMBA** tab, and then click **Create a Directory**. This will open the **Directory Labels and Permissions** page.



Directory Labels and Permissions

Administrators may configure directory labels and permissions on this page. When finished, click **Apply**. When creating a directory there are three main parameters that must be configured: the directory name (by which it will be represented in the file tree), a short description of the directory, and which volume the directory will be

written to. Because RAID 0, RAID 1, and BIG architectures are built as only a single logical volume, the **Disk Volume** drop down will only be meaningful in JBOD configurations.


Directory Labels and Permissions
This page allows you to edit the directory names, published descriptions, and directory-level permissions for each user.
If directory permissions are changed here, the changes will take precedence over any previous settings that were configured over the User Management page.
Disk Volume is a static parameter established when the directory is created, and is only meaningful in JBOD configurations.
Directory Labels
Directory Name *:
Disk Volume *:
Volume 1
Description *:
Directory Permissions, by User
User Name
Read Only
Read/Write
Deny Access
demo
Apply

In the **Directory Permissions, by User** table users may configure permissions for the newly created directory according to user accounts.

ATTENTION

Permissions that are changed in the **Directory Labels and Permissions** page will be applied system wide. This means that any permissions that have been configured using the **User Quotas and Permissions** page *will be overridden* by the new values.
In addition, if you want to use DataXPro, you have to enable it before you create a shared network folder.

Editing and Deleting Directories

If you wish to edit directory labels and permissions for an existing directory, return to the **Directory Creation and Management** page by clicking on **Directories** under the **SAMBA** tab in the main menu ribbon.

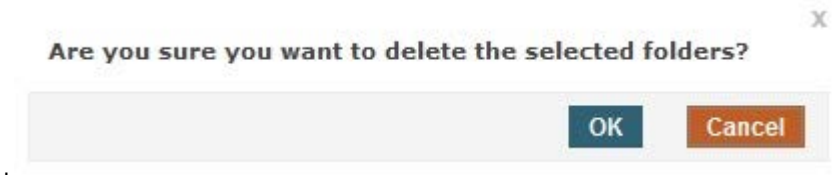
Directory Creation and Management
This page gives an overview of filesystem information such as disk usage by directory, and allows you to edit directory settings.
To access permissions and other directory settings, click on the Edit icon at the far right.
Directory Information and Permission Management
Create a Directroy
Delete Directory(s)
Directory Name
Size
Disk Volume
Edit
demo
6 GB
Volume 1

Deleting Directories

If you want to delete a directory, check the box next to the directory name and then click **Delete Directory(s)**.

Directory Creation and Management
This page gives an overview of filesystem information such as disk usage by directory, and allows you to edit directory settings.
To access permissions and other directory settings, click on the Edit icon at the far right.
Directory Information and Permission Management
Create a Directroy
Delete Directory(s)
Directory Name
Size
Disk Volume
Edit
demo
6 GB
Volume 1

Click **OK** to confirm



9

Vibration and Temperature Protections

The following topics are covered in this chapter:

- **Configuring Data XPro™**
  - Vibration Protection
  - High Temperature Protection

Configuring Data XPro™

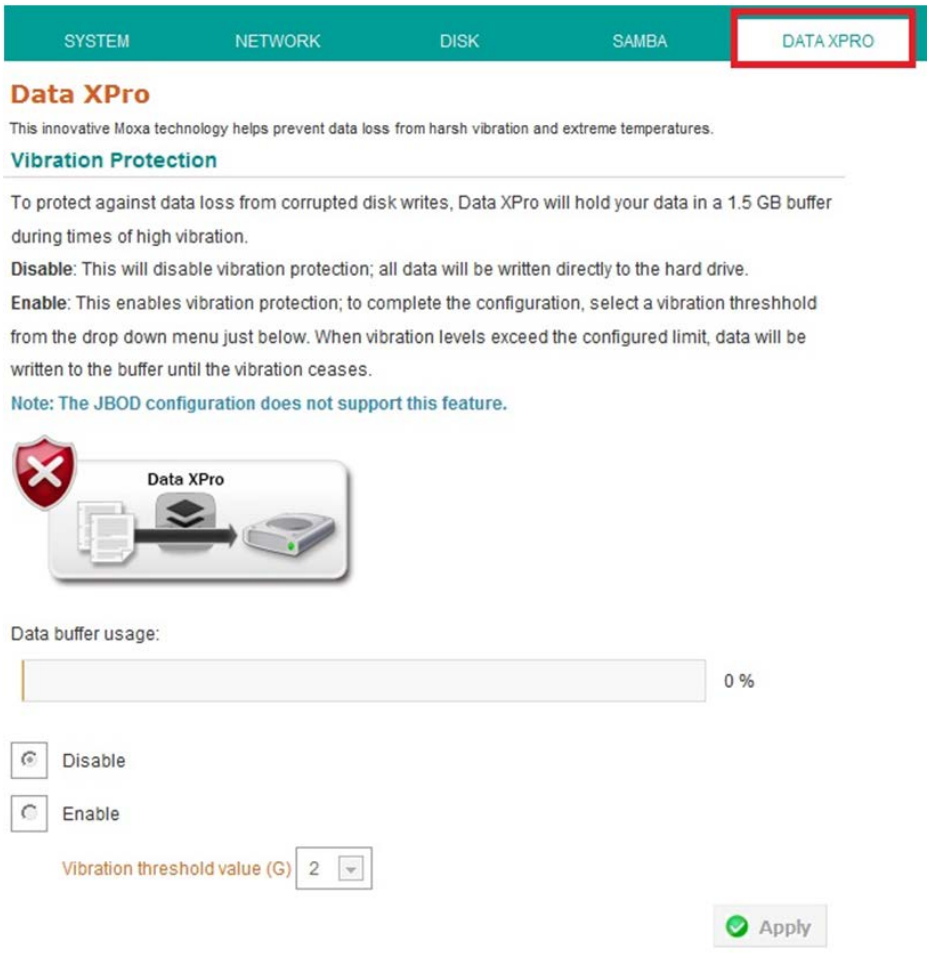
Data XPro™ is a patented, innovative technology that helps protect your data from harsh vibration and high temperature. Click the **DATA XPRO** tab from the main menu to navigate to the configuration page.

Vibration Protection

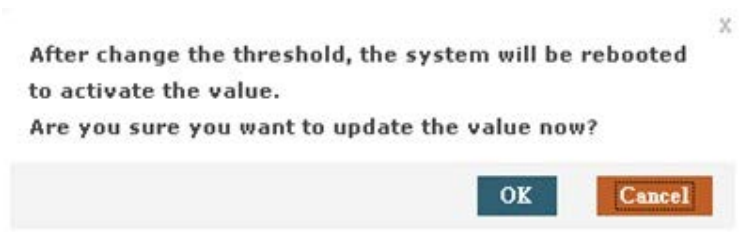
You may **Enable** Data XPro™ vibration protections by selecting the appropriate toggle in the **Vibration Protection** section of this page. Next, a vibration threshold must be selected from the drop-down menu. When vibration levels exceed the configured threshold, new data writes will be temporarily stored in a solid state data buffer. Once the vibration stops, any data modifications will be applied to the hard disk.

Please consult the manufacturer's website for the technical specifications regarding vibration thresholds for your hard drives.

Please note that vibration protection is not available under JBOD architectures.


SYSTEM
NETWORK
DISK
SAMBA
DATA XPRO
Data XPro
This innovative Moxa technology helps prevent data loss from harsh vibration and extreme temperatures.
Vibration Protection
To protect against data loss from corrupted disk writes, Data XPro will hold your data in a 1.5 GB buffer during times of high vibration.
Disable: This will disable vibration protection; all data will be written directly to the hard drive.
Enable: This enables vibration protection; to complete the configuration, select a vibration threshhold from the drop down menu just below. When vibration levels exceed the configured limit, data will be written to the buffer until the vibration ceases.
Note: The JBOD configuration does not support this feature.
Data XPro
Data buffer usage:
0 %
Disable
Enable
Vibration threshold value (G)
2
Apply

When finished, click **Apply**. You need to reboot the RNAS-1200 to activate the configuration. Click **OK** to reboot.


After change the threshold, the system will be rebooted to activate the value.
Are you sure you want to update the value now?
OK
Cancel

ATTENTION

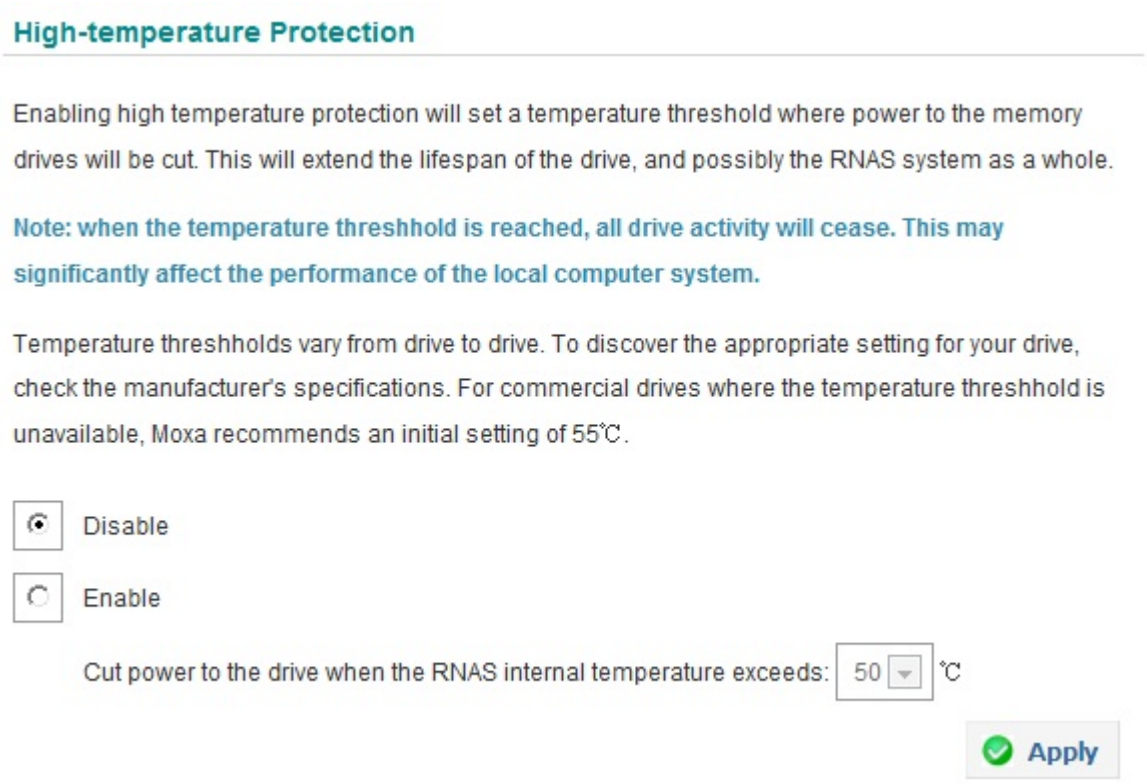
1. For a 500GB HDD, it will take about 5 minutes to complete the process to enable DataXPro vibration protection.
2. The data on the disk volume will be formatted after configuring DataXPro. We strongly recommend you backup your data before configuring DataXPro.

High Temperature Protection

Select **Enable** to configure the temperature thresholds for protection against heat.

ATTENTION

Be aware that when the system reaches the configured heat threshold **all** drive activity will stop, and will not recommence until the total system temperature decreases to levels lower than the configured threshold. *During this time, no data will be stored in the buffer and your NAS system will effectively shut down.*


High-temperature Protection
Enabling high temperature protection will set a temperature threshold where power to the memory drives will be cut. This will extend the lifespan of the drive, and possibly the RNAS system as a whole.
Note: when the temperature threshhold is reached, all drive activity will cease. This may significantly affect the performance of the local computer system.
Temperature threshholds vary from drive to drive. To discover the appropriate setting for your drive, check the manufacturer's specifications. For commercial drives where the temperature threshhold is unavailable, Moxa recommends an initial setting of 55℃.
Disable
Enable
Cut power to the drive when the RNAS internal temperature exceeds: 50 ℃
Apply

10

Enabling Fast Synchronizations for RAID 1

The following topics are covered in this chapter:

- **Enabling Fast Synchronizations**

Enabling Fast Synchronizations

The RNAS-1200 features **Fast Synchronizations** for its RAID 1 architecture. While this comes at a small cost to regular access times, when this feature is enabled the file system will store the position of the last successful write and, in the event of unexpected system crashes, begin resynchronization of the drives from that position. This means that unexpected system crashes will no longer cripple your RAID with laborious, hours-long resynchronization processes. When data inconsistencies occur, fast synchronizations will be able to synchronize a two disk array in only seconds, or two or three short minutes at the very most. **Please note that fast synchronizations are only meaningful in RAID 1 architectures.**

ATTENTION

To enable fast synchronizations, you must toggle the **Fast Synchronization** box when you are configuring your RAID 1 array.

SYSTEM
NETWORK
DISK
SAMBA
DATA XPRO
Disk Volumes
RAID
RNAS Drive Architectures
On this page, you may configure the RNAS drive arch
re offered: JBOD, BIG, RAID 0, and RAID 1.
For installations requiring high data security and drive reliability, Moxa recommends RAID 1 as the optimal configuartion.
RAID 1
Enable disk encryption
For the RAID 1 configuration, all data is fully duplicated, with one drive mirroring and journalling all data recorded to the other drive. This provides full data backup at half the failure rate of a normal drive, but at the cost of reducing the total capacity of the raid to that of a single drive. RAID 1 is among the most secure forms of memory storage available.
Fast Synchronization
Enable
Disable
Apply

11

Enabling IHS™

The following topics are covered in this chapter:

- **Setting Up IHS**
- **Hardware Version 1.1 IHS Settings**

Setting Up IHS

The RNAS-1200 offers an Intelligent Heating Solution™ (IHS) to ensure the system will work reliably even in extremely low temperatures. IHS is an automated, onboard heating system that will heat a hard disk or solid state storage drive to a preset temperature. If the RNAS-1200 is booted up and the system senses the environmental temperature has dropped to below freezing (zero degrees Celsius / 32 degrees Fahrenheit), the RNAS-1200 may heat the system to either -25°C (TX mode) or 0°C (T1 mode), depending on how the utility is configured.

The system ships with IHS TX mode already enabled. To function properly, IHS requires storage drives specifically designed for harsh environmental conditions. In industry literature these types of drives are often called "automotive grade." Below is a list of drives which are currently (Oct. 2012) approved for use on the RNAS-1200 system. This list will be continuously updated as Moxa's technical support teams verify new drives for approved use, so to find the most recent list of approved drives you may visit the Moxa RNAS support documentation pages, or attempt to download the file directly from this link.

Industrial-Grade Hard Disk Drives Approved for IHS TX Mode (Oct. 2012)		
Manufacturer	Capacity	Model Name
Hitachi (Endurastar)	100GB	HEJ421010G9SA00
Toshiba (MKxx60GSC)	100GB	MK1060GSC
Industrial-Grade Hard Disk Drives Approved for IHS T1 Mode (Oct. 2012)		
Manufacturer	Capacity	Model Name
Hitachi	100GB	HEJ421010G9SA00
Toshiba	100GB	MK1060GSC
WD	500GB	WD5000LPVT
WD	500GB	WD5000BUCT
Seagate	500GB	ST9500325AS

The IHS **TX mode** is for the most severe cold weather environments. This requires a specially manufactured industrial-grade storage drive (such as some of the Hitachi Endurastar or Toshiba MKxx60GSC products) designed for environmental extremes. When configured for TX mode, upon detecting external temperatures that is less than -25°C the RNAS-1200 will, over the course of 20 minutes, heat the system to -25°C and then automatically boot up the system.

The design requirements for IHS **T1 mode** are not so severe as those for TX mode. When configured for T1 mode, upon detecting external temperatures that is less than 0°C the RNAS-1200 will, over the course of 45 minutes, heat the system to 0°C and then automatically boot the system.

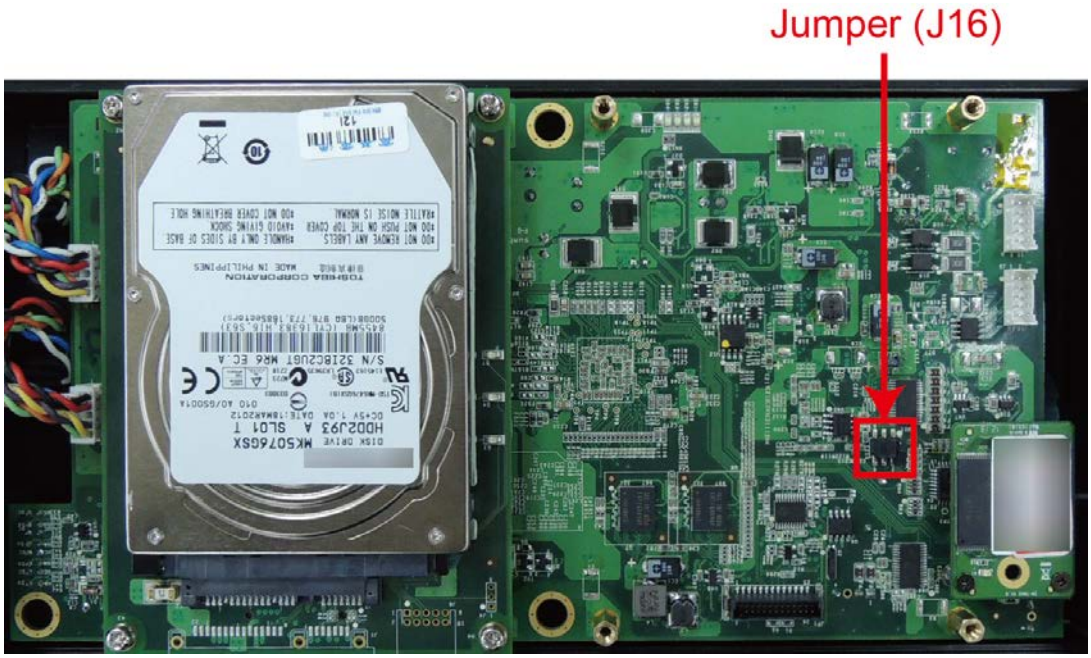
To set up the RNAS-1200 for IHS T1 or TX mode (or to disable IHS), you will need to access the RNAS PCB to set the onboard jumpers. The steps below describe how to configure the onboard IHS jumpers.

Step 1: Remove the screws and the top cover of the RNAS-1200. To review how this is done, please refer to the manual section **Installing the Storage Drive**.

Step 2: Remove the hard disk on the right side to expose the location of jumper **J16**. Please see the photo at the top of the next page for a detailed picture of where the J16 jumper series is located.

ATTENTION

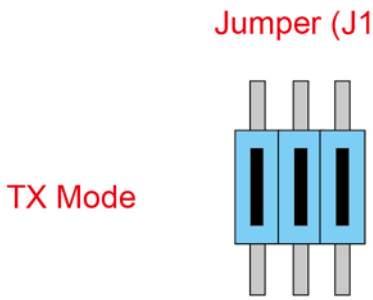
Please note that for the **RNAS-1201** and **RNAS-1211** models ***TX mode is the system default***. Unless you have installed suitably engineered hard disks, you will need to switch the system to either disable IHS or switch it to T1 mode. Using TX mode with commercial grade hard drives in cold weather may result in severe and irreversible damage to your storage drives.



Step 3: To switch the IHS mode, adjust the jumpers to one of the configurations shown below.

TX Mode (-40 to -25°C):
System Default

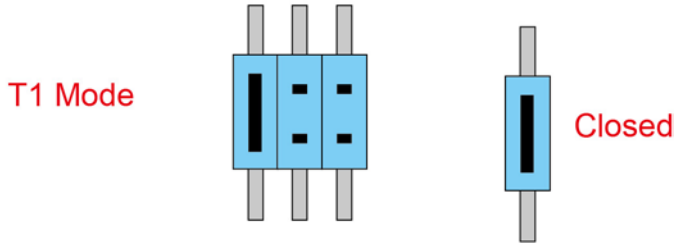
This mode is for the most extreme environments, and requires the most rugged drive hardware. Over the course of 20 minutes, TX mode heats the drive to -25°C and then automatically powers up the system.



T1 Mode (-25 to 0°C)

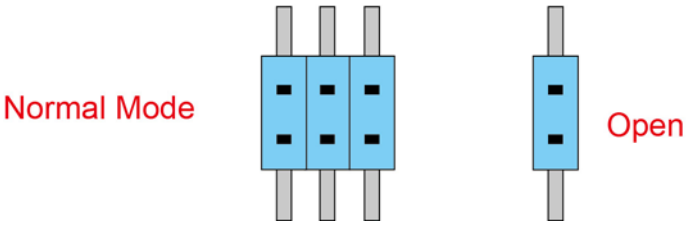
T1 is for environments that often fall below freezing, but do not go below 25°C; it also requires industrial-grade drive hardware. Over 45 minutes T1 mode will heat the HDD to 0°C and then power on the system

.



Disabled:

To entirely disable IHS, remove all jumper covers. This will completely turn off the heating system so that no automated heating processes will be active.

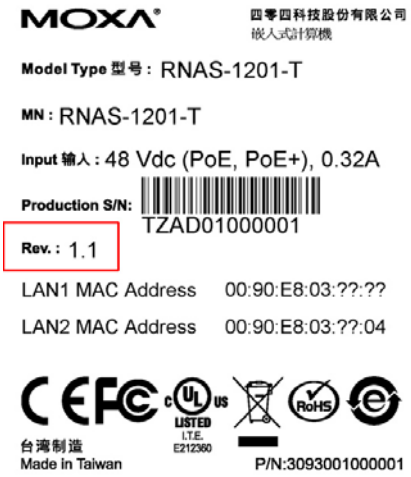


Step 4: Replace and secure the hard disks and chassis to complete the IHS configuration.

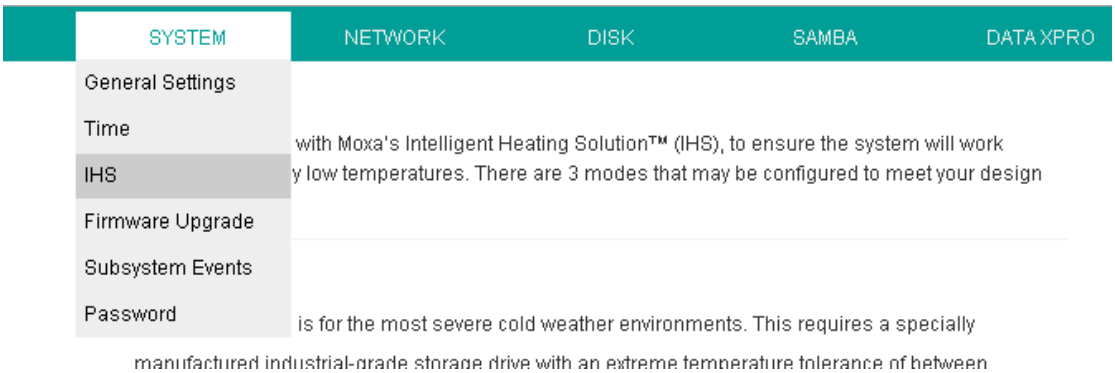
Hardware Version 1.1 IHS Settings

For the RNAS-1200 with hardware version 1.1, the IHS can be configured via the web browser, without adjusting the jumper. Follow these steps for the configuration.

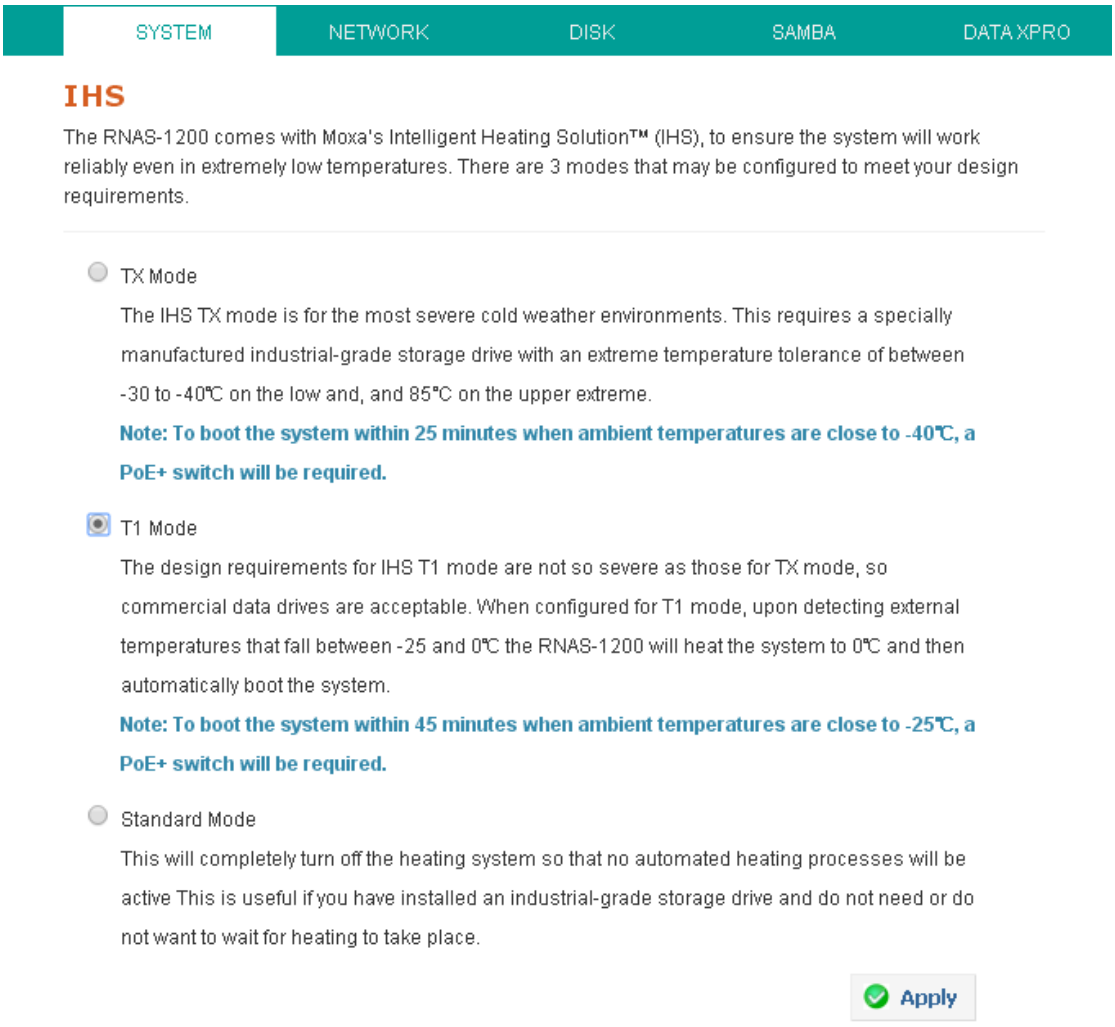
1. Check the label on the rear panel of the RNAS-1200, and make sure the version is 1.1.



2. Select **IHS** in **SYSTEM** tab in the web browser.


SYSTEM
NETWORK
DISK
SAMBA
DATA XPRO
General Settings
Time
IHS
Firmware Upgrade
Subsystem Events
Password
with Moxa's Intelligent Heating Solution™ (IHS), to ensure the system will work
y low temperatures. There are 3 modes that may be configured to meet your design
is for the most severe cold weather environments. This requires a specially
manufactured industrial-grade storage drive with an extreme temperature tolerance of between

3. Select the mode you want to use, then click **Apply** to take effect.


SYSTEM
NETWORK
DISK
SAMBA
DATA XPRO
IHS
The RNAS-1200 comes with Moxa's Intelligent Heating Solution™ (IHS), to ensure the system will work reliably even in extremely low temperatures. There are 3 modes that may be configured to meet your design requirements.
TX Mode
The IHS TX mode is for the most severe cold weather environments. This requires a specially manufactured industrial-grade storage drive with an extreme temperature tolerance of between -30 to -40℃ on the low and, and 85℃ on the upper extreme.
Note: To boot the system within 25 minutes when ambient temperatures are close to -40℃, a PoE+ switch will be required.
T1 Mode
The design requirements for IHS T1 mode are not so severe as those for TX mode, so commercial data drives are acceptable. When configured for T1 mode, upon detecting external temperatures that fall between -25 and 0℃ the RNAS-1200 will heat the system to 0℃ and then automatically boot the system.
Note: To boot the system within 45 minutes when ambient temperatures are close to -25℃, a PoE+ switch will be required.
Standard Mode
This will completely turn off the heating system so that no automated heating processes will be active This is useful if you have installed an industrial-grade storage drive and do not need or do not want to wait for heating to take place.
Apply

12

Setting Up Network Shares

The following topics are covered in this chapter:

- **Building a Network Share on Windows Systems**
  - Method 1: Manual Login
  - Method 2: Building a Permanently Mapped Share
  - Deleting a Permanently Mapped Share
- **Building a Network Share on Linux Systems**
  - Connecting to the RNAS-1200 SAMBA Server
  - Deleting a Mapped Folder on Ubuntu Linux

Building a Network Share on Windows Systems

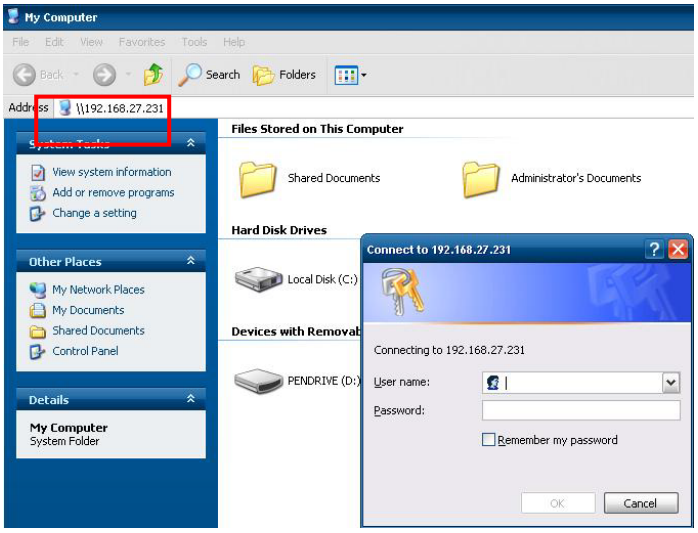
To build a Windows network share from a client computer to the RNAS-1200 users may use one of two methods. The first is a manual login; each time you connect you will need to type the RNAS-1200's network IP address, username, and password, and connections will be subject to timing out.

The second method is to build a permanent shared folder link on your computer desktop. The advantage of this is that your computer will have a transparent link to the shared directory that will allow you to access it as if it were merely another directory on your local hard drive. However, if the networking information changes or if you wish to connect to a second RNAS you will likely need to purge your computer of the permanent settings.

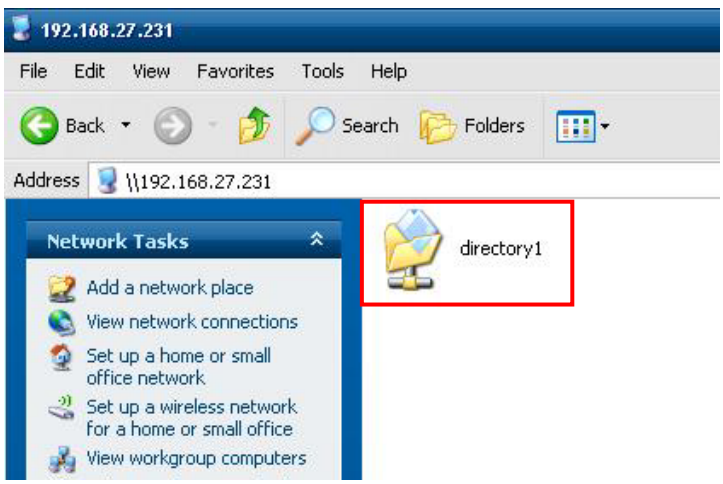
Method 1: Manual Login

Step1: Type the network IP address into the address field of the Windows Explorer file manager and press **Enter**. Your computer should now automatically connect to the RNAS-1200's SAMBA server.

Step2: Once the file manager is connected to the SAMBA server, Windows will ask you for a user name and password. At this point you should enter the username associated with the SAMBA account you configured in Chapter 8, **SAMBA: Managing Users and Directories.** Unless you have already configured directories to be available for user shares, there will be no way to continue the configuration.



Step 3: After successfully logging on to the RNAS-1200 SAMBA server, you should see any existing directories that SAMBA has been configured to share. Click on the **directory** icon to read or write files. Please note that read and write permissions are subject to any server-side limitations that may have been configured in Chapter 8, **SAMBA: Managing Users and Directories**.


192.168.27.231
File Edit View Favorites Tools Help
Back Search Folders
Address \\192.168.27.231
Network Tasks
Add a network place
View network connections
Set up a home or small office network
Set up a wireless network for a home or small office
View workgroup computers
directory1

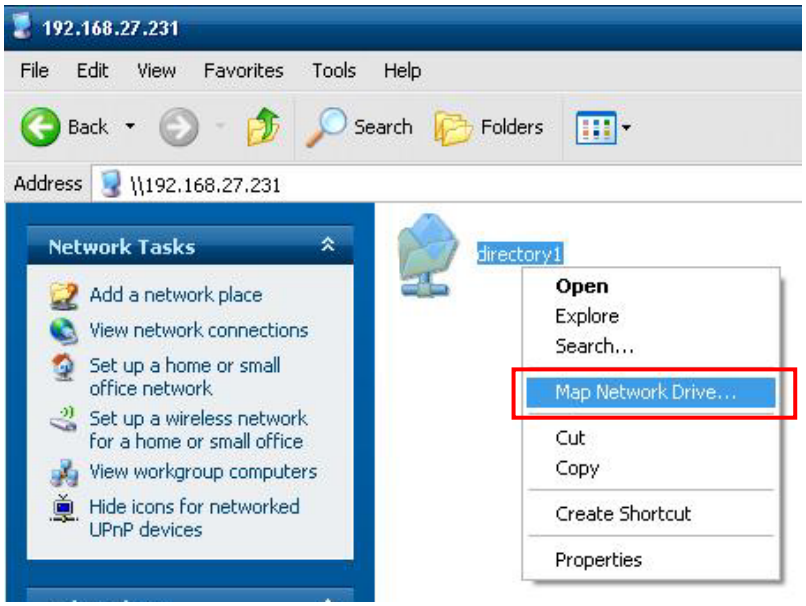
ATTENTION

The username and password associated with the SAMBA account should not be the same password and user account associated with the RNAS administration interface, or with its administrative account.

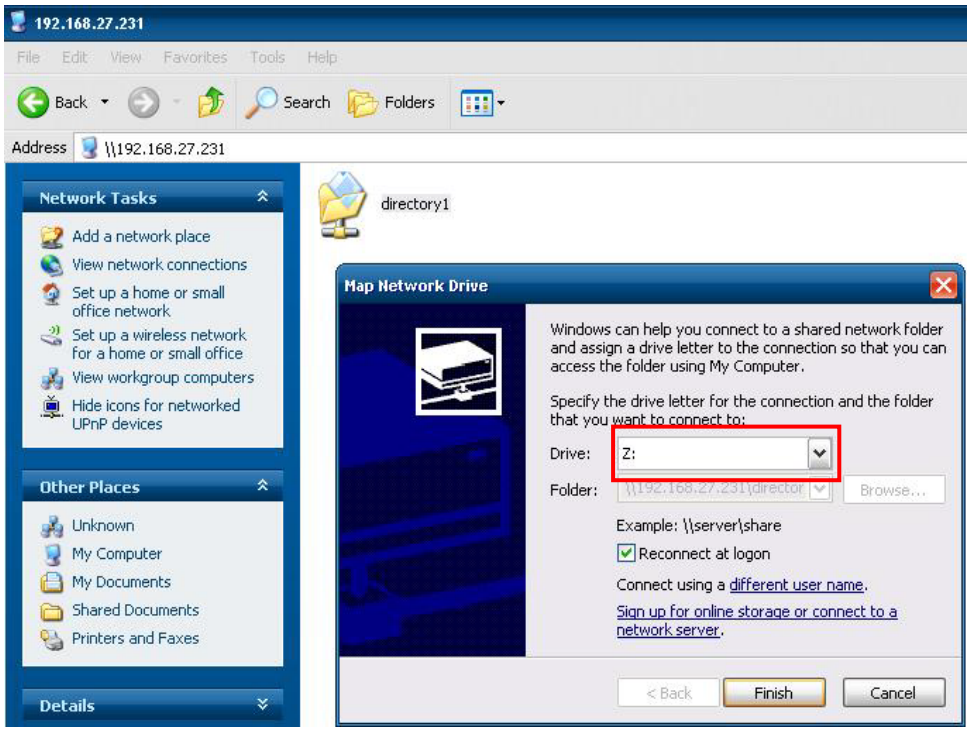
Method 2: Building a Permanently Mapped Share

If you do not want to force users to manually connect to the RNAS-1200 each time they log on, you may create a shared directory on the Windows desktop using the automated **Map Network Drive** utility.

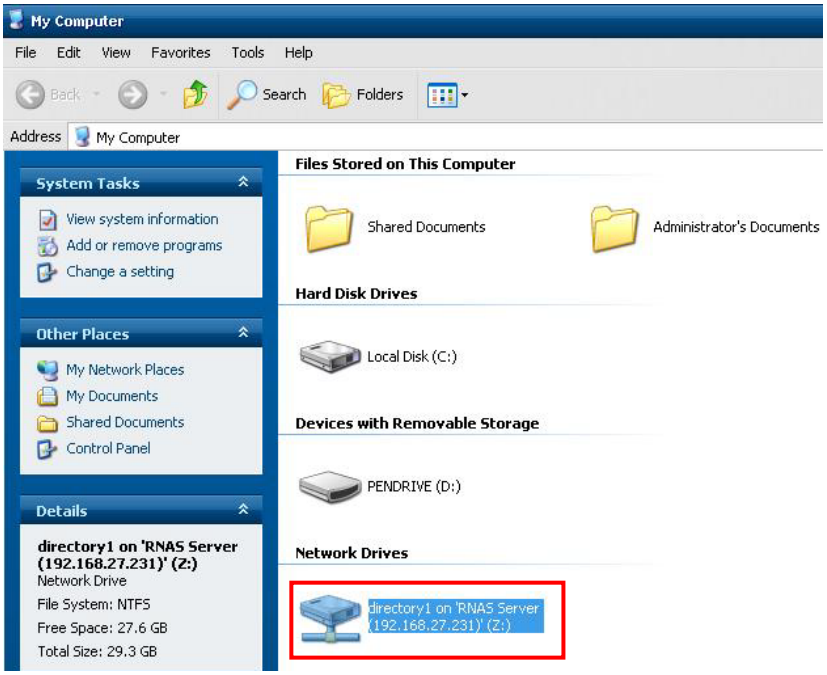
Step1: After manually logging in to SAMBA using **method 1**, right-click on the shared directory icon and choose **Map Network Drive**. You will again be prompted for the username and password.



Step2: Specify your preferred drive letter by which the connection will be identified. Click **Finish**.

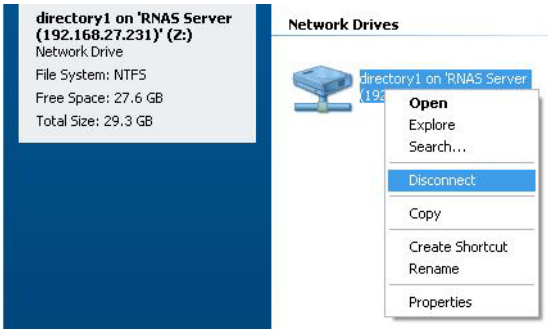

192.168.27.231
Address \\192.168.27.231
Network Tasks
Add a network place
View network connections
Set up a home or small office network
Set up a wireless network for a home or small office
View workgroup computers
Hide icons for networked UPnP devices
Other Places
Unknown
My Computer
My Documents
Shared Documents
Printers and Faxes
Details
directory1
Map Network Drive
Windows can help you connect to a shared network folder and assign a drive letter to the connection so that you can access the folder using My Computer.
Specify the drive letter for the connection and the folder that you want to connect to:
Drive: Z:
Folder: \\192.168.27.231\director
Browse...
Example: \\server\share
Reconnect at logon
Connect using a different user name.
Sign up for online storage or connect to a network server.
< Back
Finish
Cancel

Step 3: A new network drive will now appear on your computer. From now on, you will only need to double-click the drive to connect to the RNAS-1200. If you wish to create a shortcut to your desktop, you may do so by right-clicking and selecting **Create Shortcut**.



Deleting a Permanently Mapped Share

Sometimes, you may need to connect to the RNAS-1200 SAMBA server by a different user account. When this happens, you will need to delete the permanently mapped share. To do this, navigate to the **My Computer** window and right-click on the network drive. From there, select **Disconnect**.



Alternately, you may delete the configuration using the console command `C:\...>net use \\IP address /delete`, as shown below.

```
C:\Documents and Settings\Administrator> net use \\192.168.27.231 \delete
\\192.168.27.231 was deleted successfully
```

If you have forgotten the RNAS-1200's IP address, just use the command **net use**:

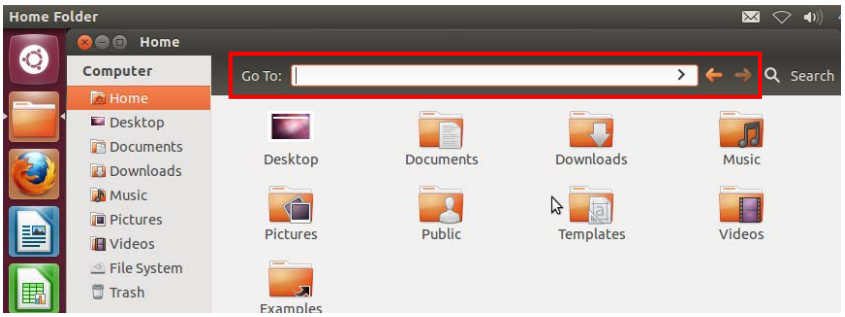
```
C:\Documents and Settings\Administrator> net use
New connections will be remembered.

Status       Local     Remote                    Network
-------------------------------------------------------------------------------
OK                     \\192.168.27.231          Microsoft Windows Network
The command completed successfully
```

Building a Network Share on Linux Systems

Connecting to the RNAS-1200 SAMBA Server

If you are using the **Linux Ubuntu GUI**, you will only be able to access the RNAS-1200 SAMBA server after first installing the smbfs package. You may use the Synaptic software manager, or **`#:/apt-get smbfs`**. After installing the appropriate software, simply follow these steps:

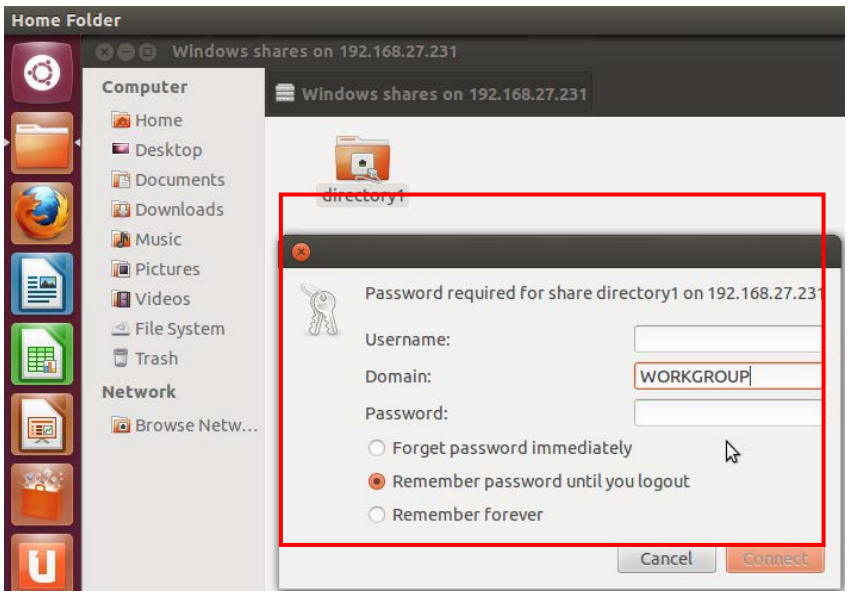
Step 1: Open the **Home Folder** window, in the **Places** menu. Then press **Ctrl + L** to display the **Go To** table.



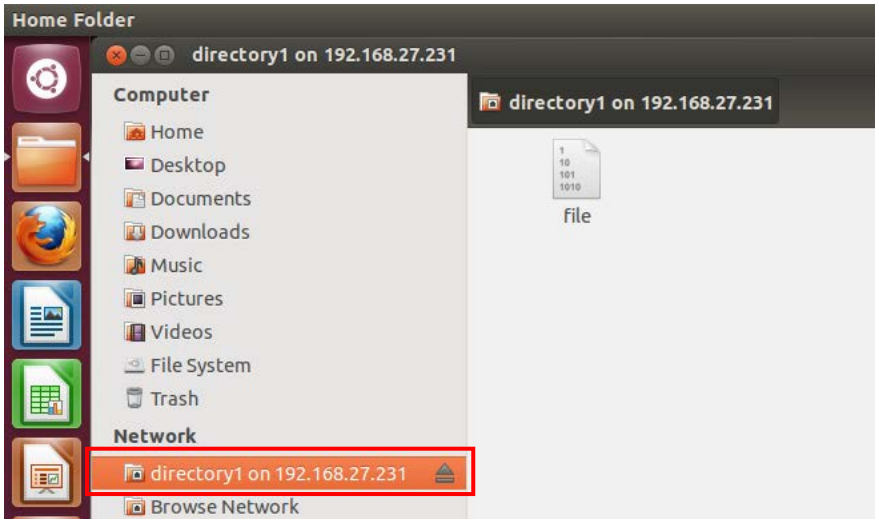
Step 2: Enter **`smb://IP address`** to connect the RNAS-1200.

Step 3: You should now be able to see the shared directory.

Step 4: Click on the shared directory icon and a dialog should appear. Here you may enter the user name and password for the SAMBA share you wish to access. You may also need to configure a workgroup name. The default workgroup name for both Ubuntu and the RNAS-1200 SAMBA server is the same as the Windows default workgroup name: **WORKGROUP**. Type this into the **Domain** field, then click **Connect**.



Step 5: You should now be able to access the SAMBA share locally, from your computer, as a network-extended directory.



To do this from the Linux Console, you may follow these steps:

Step 1: First, install the SAMBA file system software.

```
root@~#:apt-get smbfs
```

Step 2: Mount the Samba share directory using the following commands:

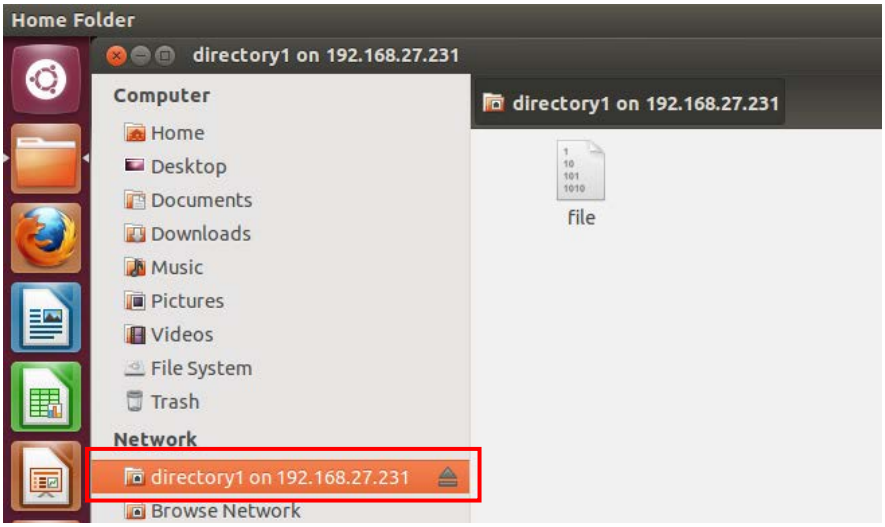
***smbmount //IP address/DIRECTORY_NAME /LOCAL_DIRECTORY ***
-o username=USER_NAME,password=PASSWORD

```
root@~#:smbmount //IP address/DIRECTORY_NAME /LOCAL_DIRECTORY \
-o username=USER_NAME,password=PASSWORD
```

Deleting a Mapped Folder on Ubuntu Linux

If you are using **Linux Ubuntu**, see this step:

Right-click the **DIRECTORY_NAME on IP addrerss** in Network list, and then select **umount** to disconnect.



If you are comfortable using the **Linux Console**, you may use the **`umount`** command to unmount a shared Samba directory.